CAMPBELL ISLAND
meteorologicalstation
BUILDINGS, CONDITION & PLANS

MEASURED FEBRUARY 2017

FOR

DEPARTMENT OF CONSERVATION SOUTHLAND

BY

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REVISION 1 OCTOBER 2017

Figure 0-1
COVER, Sea Lion, Met station in the background, Photo from "Subantarctic Campbell Island " by Alfred M. Bailey and J.H. Sorensen.

Figure 0-2 & 0-3
ABOVE & LEFT, Navy staff, HMNZS Otago, with DoC staff. (multi- coloured). Author, Paul Cummack, orange jacket, bottom right, with white beard & little hair.

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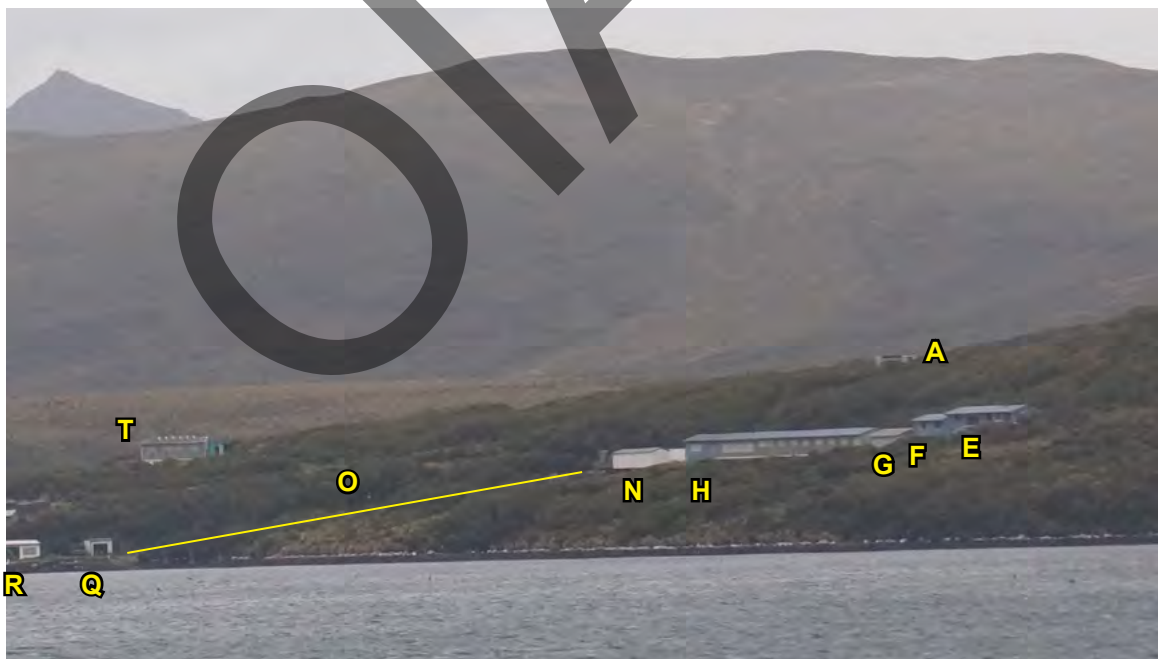
Figure 0-4
LEFT Meteorological station, south.

Figure 0-5
BELOW Meteorological station, north.
The Technical building is shown in both photos.



A Aurora House
E DoC Hostel
F DoC Hostel Extension
G Hostel – Annex
H Hostel
N Bulk Food Store
O Trolley Track
Q Boat Shed – Jetty ramp
R Paint & Spirit Shed
S Jetty Store
T Technical Building
U Jetty & Crane
W Generator House
Y Hydrogen Building

ABOVE, The meteorological station, at Beeman Base, Campbell Island, Februrary 2017, taken from HMNZS Otago.
The key to the letters is to the left

1 EXECUTIVE SUMMARY

1- Over the past decade, less than 40% of the buildings on Campbell Island have been occupied by people or materials at any point. In general, the buildings that have been used are those with less durability and less heritage significance.

2- The wall cladding chosen for the main buildings when the base was established was of such a high standard that no maintenance work has been required on them in the last 60 years, nor is work required in the short term future. Cheaper materials of lower durability have been used with each subsequent decade until now when the most recent repairs require redoing after two years (plywood shutters and flashings). In addition to this, the net result of this recent intervention has made the whole durability of the building worse than if nothing had been repaired or added. (Refer section 1g).

3- Over the last two decades, in general, cheaper materials of low durability have been used to repair many buildings. The lack of a long-term plan of repair and maintenance, together with the fact that the Navy bears transportation costs, means that the true cost of installing such fabric is not considered when work is undertaken. In short, low cost, less durable materials require replacement more quickly than higher quality, more expensive materials. (See section 1L)

4- There is an alarming back log of deferred large expenditure re-cladding maintenance. (Refer figure 1.2 below).

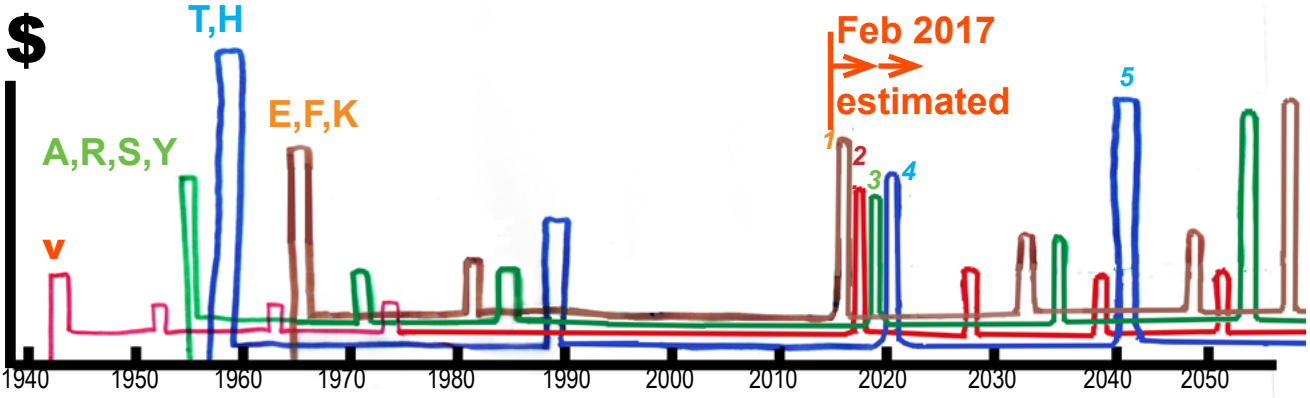
5- To re-clad even 40% of the buildings will require tradespeople to sleepover on the island. D.o.C. to check limitations for water supply and septic tank capacity. The World Heritage application, clause 4.3.4 *Tourism*, permits a maximum of 600 "tourist landings" and does not limit tradespeople. The working day is too short if tradespeople are navy ship based. (See section 1i)

6- Reducing the building stock to 40% of its current level would require even better co-operation between the MetService and DoC.

7- In future, work on buildings should be undertaken by appropriately skilled tradesmen. Well intentioned volunteers, or people who have expertise in a different trade, lack the skills to do the appropriate work effectively enough to ensure that it does not have to be replaced prematurely. (Section 1g & 1r).

Figure 1-1
ABOVE The very historic Tucker Hut, near to demolished by neglect.

Figure 1-2
BELOW A generalised (anecdotal) indication of costs. Tucker hut (V) [red] with initial cost for building, then every 10 years cost for re-painting . Zinc clad buildings (E,F,K) [brown] the initial cost is more, and the gap between maintenance is longer. The Technical building (T) and Hostel (H) [blue] the initial cost is higher again and the gap between maintenance is even longer. Between 1995 and 2017 there is a gap where periodic maintenance has not been completed.
In the future [1] replace perforated zinc cladding, [2] repair Tucker Hut, [3] repair and repaint timber framed buildings, or re-clad, since painting in a damp environment is time consuming, [4] replace Technical building roof and cladding under copper treated window shutters. [5] re-clad rest of aluminium on Hostel and Technical building. The estimated dates further out from Feb. 2017 are VERY approximate.



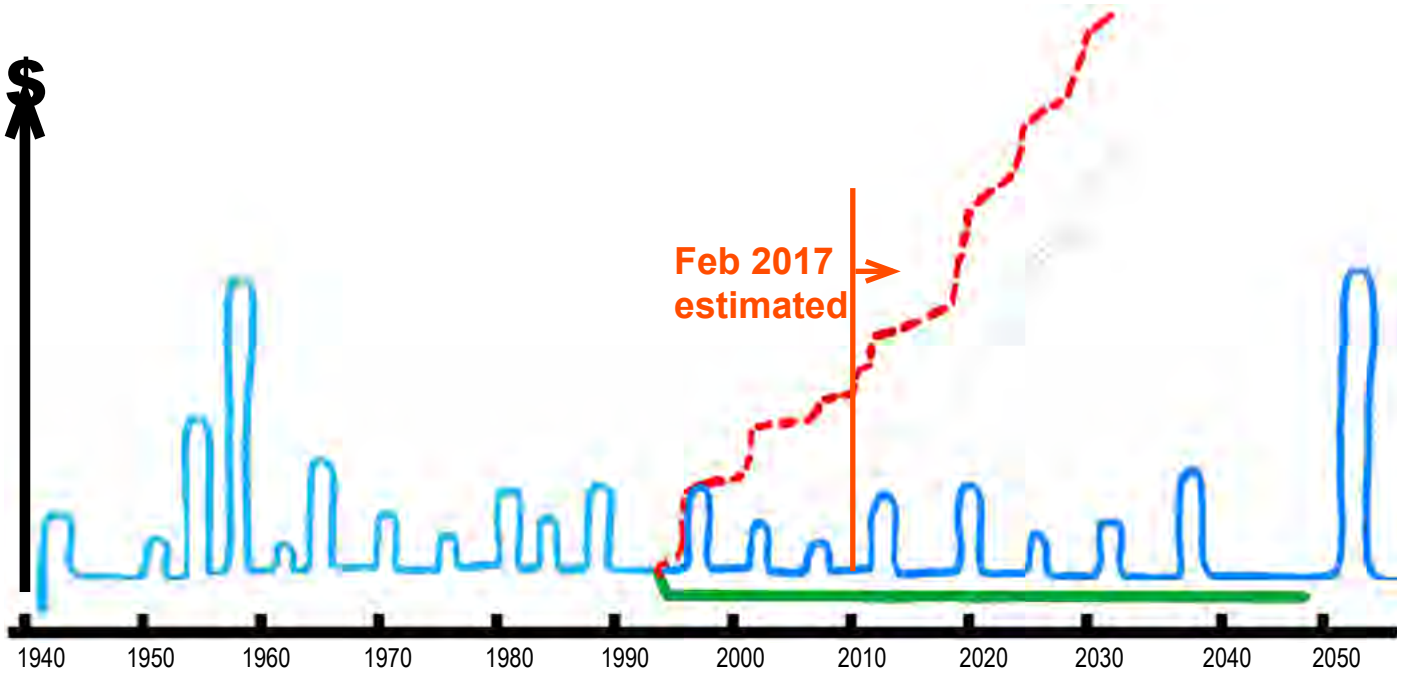


Figure 1-3 ABOVE Accumulated costs, generalised & anecdotal shown with the blue line. Expenditure on larger maintenance items stopped between around 1995 and 2017 and the green line shows the reduction in costs at this time. If maintenance is not completed in a timely manner, then there are secondary maintenance costs that must be added. For instance, a cladding that has already perforated will rot out the structure underneath, hence, the recovery costs of re-establishing a periodic maintenance programme, (the red dotted line) is exponential . The costs start at the vertical red line, then drops down to the blue line after an initial high expenditure.

Figure 1-4
ABOVE An industrial laser was used to check the condition of the foundations, these measurements are on the plans, eg FFL +10.

Figure 1-5
BELOW A sliding hammer was used to check moisture levels INSIDE the wall

Acknowledgments. I would like to thank all the staff from D.o.C. and Met service, photographed in figure 0-2 & 0-3, for their passionate and committed help with the preparation of this report, especially on site.

Also, Michael Kelly, Historian, for his clarification and collaboration of heritage significance.

1a - Observation Methodology. This report contains a series of plans, measurements & photographs, with observations, of the buildings that exist on the meteorological station, Beeman Base, Campbell Island, as of February 2017, with the aim of establishing a snap shot of the condition of these buildings. A "walk past" assessment was completed of the walls, roof, and foundations of these buildings with these areas photographed as appropriate. At random one position in each building was chosen to complete a detailed spot check of the condition of this single part in each building. Detailed checks were not completed of the other areas in each building.

The plans that follow in section 1 condense the large amount of information obtained on this field trip into a general form that can more easily be digested.

In section 2, the condition of each building is detailed by plans, dimensions and a written summary, with photographs of specific details also attached. The remaining photographs that could be useful, for reference purposes when work is planned, are included on a disc that is attached to this report.

1b - Historic: The Tucker Hut (figure 1-1) is the most historic building in the suite of buildings I investigated. This building provided accommodation, in part, for the World War 2 coastal watchers. It is also in the worst condition and requires a complete rebuild.

Closely following this, the Hydrogen Building (below) is very significant and provided the mechanism, (weather balloons), for obtaining weather data, and is of very high historical significance. This building is also near to a demolished from neglect . The other buildings on the meteorological base, part of the Hostel, the Technical Building, and the jetty structures, including the Marsden matting, are all of high historic significance and are all worthy of preservation. Where previously we thought one Hostel room drawn as number 7 in figure H2, for "PJ", had all the original furniture in this room, we now know that this furniture was a recent addition, and of little historical significance.

Figure 1-6
ABOVE A lot of the cladding around Beeman Base is ending its natural life. In this case the roofing has perforated.

Figure 1-7
ABOVE The historic hydrogen building, near to demolished by neglect

1c - Structure:. The condition of most buildings, behind the cladding, seems to be structurally sound. However this is not true of the Tucker Hut, Jetty Ramp Boat Shed, and to a lesser extent the Hydrogen Building, all of which are close to demolition from neglect.

For most buildings the special foundation piling systems used in the unique very soft and deep peat show little or no settlement when measured with a laser. These piles, of silver pine, are expected to last 90 years. (figure 1-17 and also figure T-19) However all buildings require minor additional fixings between the foundation piles, bearers and joists to assist in providing a small amount of earthquake resilience.

Minor additional fixings are also required on all buildings between the roof purlins, roof truss, and the wall top plate to resist cyclone winds. Fixings at present are below any new building standard minimums in situations with less wind.

Figure 1-8
BELOW The typical structure, minor modifications required to add connections to limit earthquake damage are missing, red circle.

Figure 1-9
ABOVE Corrosion on ferrous cladding material, installed post 1960,

Figure 1-10
BELOW Pure Zinc cladding, corroded to en extent that the cladding has perforated. Installed pre 1960

Figure 1-11
BELOW Pre 1955 cladding is generally in good order, for instance on these wharf buildings. However repaints may be slow in an area of high rainfall.

1d - Post 1960 cladding. This cladding together with recent materials used for maintenance, in most cases is in very poor condition. The lack of durability reflects the fact that a more economical material has been chosen. These areas need replacing in less than one decade on nearly all buildings built after 1960. In a lot of cases perforation has already occurred in one location and more, and holes that allow water into the structure are both enlarging and multiplying. With this perforation the likelihood of structural damage from rot of the timber framing inside the wall will increase exponentially.

1e - 1955 to 1960 cladding The cladding on about half the buildings constructed in this period have a better durability. However replacement is generally also required in less than one decade. These time periods are only applicable if the window shutters are replaced. (Refer section 1p) Without window shutter replacement the likely durability could be only a few years before the cladding is perforated.

The extent of re-cladding work required, from that installed from 1960 to the present day, is alarming because of the quantum of work required

1f - Pre 1955 cladding For the cladding systems on the pre 1955 buildings, only minor maintenance to ensure continued waterproofing is required.

1g - Life cycle costings. The above cladding clauses highlight a general pattern of cost savings and budget cuts over the last two decades. The recent choice of economical non-durable materials for cladding does not reflect the true life cycle cost of maintaining these buildings.

The extent of cost savings and budget restraints has now developed to an extent that, in the effort to save money, the methodology &/or materials chosen are in appropriate.

An example of this (figure 1-12) is the copper treated plywood used as window shutters around aluminium cladding. The addition of copper treated plywood shutters (**C**) has caused the aluminium to corrode prematurely, (**P**) and cladding perforation has already started to occur below the copper shutters. The aluminium away from this recent shutter addition (**E**) is displaying excellent durability and is functioning well.

Piece-meal alterations like this mean that the buildings would have been better off if nothing had been completed.

Other examples include the DoC hut, where recent timber window additions were not installed correctly (figure E6 - refer 24% ; figure E10 & E11) with a robust combination of flashings, and one window will be causing structural degradation below the window sill soon.

Also, the recent 'diesel feed' fire was flashed with non-durable flashings, and again this area will cause structural failure shortly. (Figure E12)

The flat membrane roof on the Hostel was replaced with a metal roof which has a flat or a negative slope, and water will collect at the top of the roof. (Figure H13)

The most recently constructed Cool Store has cladding that does not cover the bottom plates, and these will rot out prematurely. (Figure J4)

If suitably qualified construction personal were involved then repairs or additions would match the existing durability of the rest of the building. This also applies to adequate on-site construction supervision; so that when problems are encountered the best durable solution can be selected. The extent of cost savings and budget restraints is now at a level where in a many cases maintenance work on the buildings is detrimental, and in some cases to an extent that the buildings would have been better off if nothing had been completed.

Figure 1-12
Corrosion evident on the left hand side, where the copper treated shutters have been added above. The aluminium is in pristine condition for its age on the right hand side where there was no treated copper shutters added above.

Figure 1-13
ABOVE Parts of the accommodation used are shown in red, for a full plan refer section "Use - Feb. 2017"

1h - Use of Buildings The plans attached accurately show the present building stock. Looking at equipment stored inside the rooms on the base, it appears that roughly one quarter of the buildings have been occupied in the recent past, and February 2017 operations extended space requirements to one third of the existing building stock. The other two thirds show little sign of past occupation. This is an approximate estimate. The one third of occupied buildings are not those that are the most sound or durable, neither do they have the highest historic significance. Use of buildings seems to be determined by Departmental ownership.

1i - Use of Buildings, piecemeal maintenance, and weather. When "on board the ship" accommodation is being provided, the navy start at 7:30 or 8:00am for navy Zodiac preparation, transportation for all staff to the island is completed by approximately 9:00am, for a 9:30am start at the work face. At the end of the day the reverse happens with a roughly 3:30pm finish at the work face, decamp, then all transport operations, and navy zodiac storage, is complete by 5:00pm. A five and a half hour day is insufficient time to complete any extensive maintenance, especially with a climate of 300 days of rain per year. Short stays &/or short days and painting or re-cladding operations, between the frequent showers, cannot co-exist. To maintain just one third of the buildings in an effective way, with the quantum of re-cladding work necessary, a nine and a half hour working day would be required.

ADDITIONAL DETAILS ON PREVIOUS TOPICS

1j - Structural Condition: Most parts of the buildings are structurally sound. The special foundation piling systems used in the unique very soft and deep peat shows little or no settlement when measured with a laser. Standard construction tolerances of plus / minus 10mm were the only differences measured across the full length of each building. Most wall and roof structural systems are bearing up well, and the only structural requirement here is to add minor earthquake and cyclone fixings to improve the resilience and outcome in case of a natural disaster.

The above comments on buildings being structurally sound are not true for two buildings. The derelict Tucker Hut and the Hydrogen Building, are close to demolition from neglect. Both these buildings have high historical significance; the Tucker Hut has a very high rating. A third building, the boat shed above the boat jetty, is also structurally in very poor condition.

It is impossible to estimate the condition of all the structural members when generally these members are hidden behind cladding. Spot tests were completed in one area in each building, and at present the cladding, which in a lot of cases is ending its natural life, is not protecting the structural members, therefore structural decay is to be expected. The natural durability, or added durability of structural timbers, could not be investigated and may delay decay.

A sliding hammer with tungsten probes was used to penetrate the structural timbers. Generally the probes were difficult to hammer into the timbers, indicating a sound structure, however the electrical potential across these probes indicate inevitable decay. If these perforated cladding systems protecting the structure are not maintained or replaced within the next five years or there abouts, then the extent of structural decay will increase exponentially, with a correspondingly exponential increase in costs.

1k - Roof and Wall Cladding Condition: Apart from the Tucker Hut, nearly all the cladding systems installed at Beeman Base after 1960 will require replacement in the next 2 to 10 years. The claddings installed pre-1960 are performing well and only minor improvements are required. However, in recent decades the replacement cladding systems that have been used do not have the same durability of early cladding systems. Recently installed cladding systems are now ending their natural life (figure 1-14) at the same time as the earlier installed cladding material needs replacement. The extent of cladding replacement is extensive.

1L - Life cycle costings: My guess (unsubstantiated) is that the purchase of cladding and building materials is from a separate budget from that of the costs of transporting these materials to the island, and is also separate from the costs for installation. Thus considerable percentage cost savings can be made on an individual budget if non-durable cladding materials are used. This approach, however, does not reflect the true cost of maintaining the buildings. In all cases a life cycle building material cost should be used, including those factors for transportation and labour. The HMNZS Otago cost $110 million, (Radio NZ, 7:31pm 22 July 2010, Offshore patrol boat arrives) if this ship lasts twenty years then the cost for a two week period is about $200,000. Add to this, from figure 0-2 & 0-3, roughly 35 navy staff at roughly $70,000 per annum, gives a staffing transportation cost of $94,000 for two weeks. These two initial items give a transportation cost of just under $300,000 with many many more costs to add. So the cost for materials is minor, then labour, and then the large transport cost to add. Thus the cost per year of expected life is VERY important to limit re-builds and the present multiple building cladding replacement now required. However, if the buildings are becoming redundant, then stop gap non-durable re-cladding in the short term is justified.

One example of how an economical un-coordinated approach is detrimental to durability exists in the recent window shutter additions. (refer figure 1-12 and adjacent text) . Although installed with well-meaning intentions, if these window shutters had not been installed, and nothing had been done, then the cladding below may have lasted another decade or more. This cladding has started to perforate below the other plywood window shutters. I assume this intervention was required as a window blew out, however there are more appropriate ways to remedy this problem, like checking glass size. This also shows the importance for well qualified staff, appropriate to the task at hand. I also assume this remedy was completed as there was a limited materials budget or limited time budget, or there was not the specialist staff available to give timely advice on product selection.

Figure 1-14
ABOVE The upper area of the cladding on the accommodation buildings, where zinc has extensively oxidised. The next stage of the corrosion cycle is perforation.

Figure 1-15
BELOW The roof of the Bulk store (N)

1m - Immediate Use: I have only had one trip to Campbell island. However the contents of the buildings, on my review of every accessible room, give a good indication of use. From this observation a minimum requirement to provide facilities could be the:- jetty structures (Q,R,S and U) ; part of the hostel (H) ; some ancillary food, vege, and water structures (J,L) ; and parts of the Technical building required to service the aerials and climate enclosure(T).

This list does not allow for any future development, and must be read in conjunction with the heritage listings of the buildings, mentioned previously. Economies could be obtained if various different interested governmental departments can share facilities. Maybe separate locked storage facilities are required for the sole use of each government department.

1n - Design After World War II there was a brief period when a lot of governmental buildings had a window design where maximising the light penetrating into the building was more important than looking at a view when sitting down. As such nearly all windows on Beeman Base, as was common for this period, are too high to look out of when sitting. There have been numerous attempts to build platforms to raise the floor, so that occupants can see the view out of these windows that are installed too high.

Figure 1-16
BELOW Bedroom 7 "PJ" in the Hostel (H), with bespoke furniture inside, built about 1980 to 1990, here the beds are at a height that allows for views outside the window.
~~This area is of high historic significance.~~

METHODOLOGY

In addition to the detailed dimensions on the plans, the photos in this report include a scale, in red and white, either in the photo &/or both in the photo and as a scale overlaid over the photo. This provides a reference for measurements.

1o - Foundation Methodology Campbell island is covered in peat. Peat cannot support the foundations of a building, and with the thickness of this soft layer over the entire island, extra-ordinary pile lengths are required to support a light structure. Alternatively the structure needs to be supported on isolated rock outcrops. An oscillating disc laser was used to check for differential settlement of piles. Indications using this laser were that all buildings, except Tucker Hut, had piles of sufficient depth, so that each pile was most likely founded on the solid volcanic rock (basalt) layer which exists approximately between 2 and 5 metres below the surface. The inadequate piles on Tucker Hut had collapsed and the floor level variance was over 300mm in three metres.

A demountable sliding penetrometer was used to check the continuity of the density of the peat and foundation soils across the Beeman Base and Tucker Hut site. Measurements taken showed little variance in peat density between these buildings. A building can be founded on soils that can resist more than 300 kPa. In this case no special design with these soil pressures is required. For soils between 150 to 300 kPa specialist design is required. In all cases on Campbell Island soil densities could not be measured as the top layers were so soft that they were outside the building bearing pressure norms of the device used. Deep foundations, as exist generally at Beeman base, overcome this problem.

The driven piles observed at Beeman Base were either Silver Pine, (genus, Manoao) or H5 (or H6) Copper Chrome Arsenic (CCA) treated Pinus Radiata 250mm plus Large End Diameter piles. For the Silver Pine a core sample was taken through this very unusual pile type. The timber was sound throughout. In one other 120 year old historic building founded in peat, Ormondville Goods Shed, where Silver Pine driven foundations were studied, the piles had become rotten at the variable water table line, where aerobic decay and anaerobic decay coincide. Typically this rot at Ormondville was prevalent first in the center of the timber with the decayed timber then growing out to the surface. The durability of the silver pine foundations at Ormondville was between 80 to 100 years and Campbell Island has 60 year old piles.

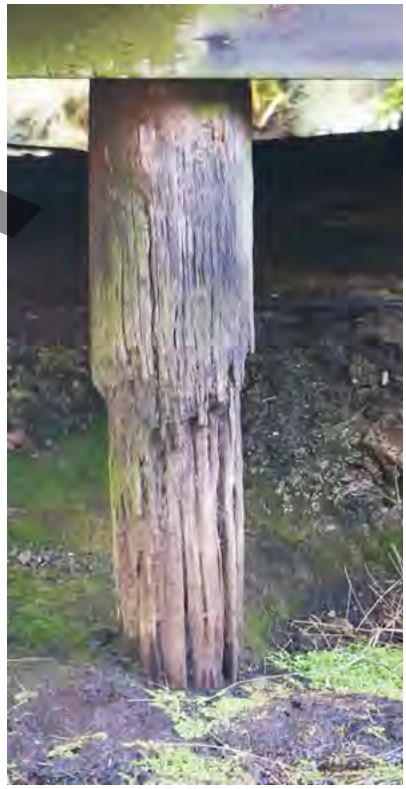


Figure 1-17
ABOVE A silver pine pile, expected durability, 90 years, with 60 years gone. Refer also section 2H in the condition report.

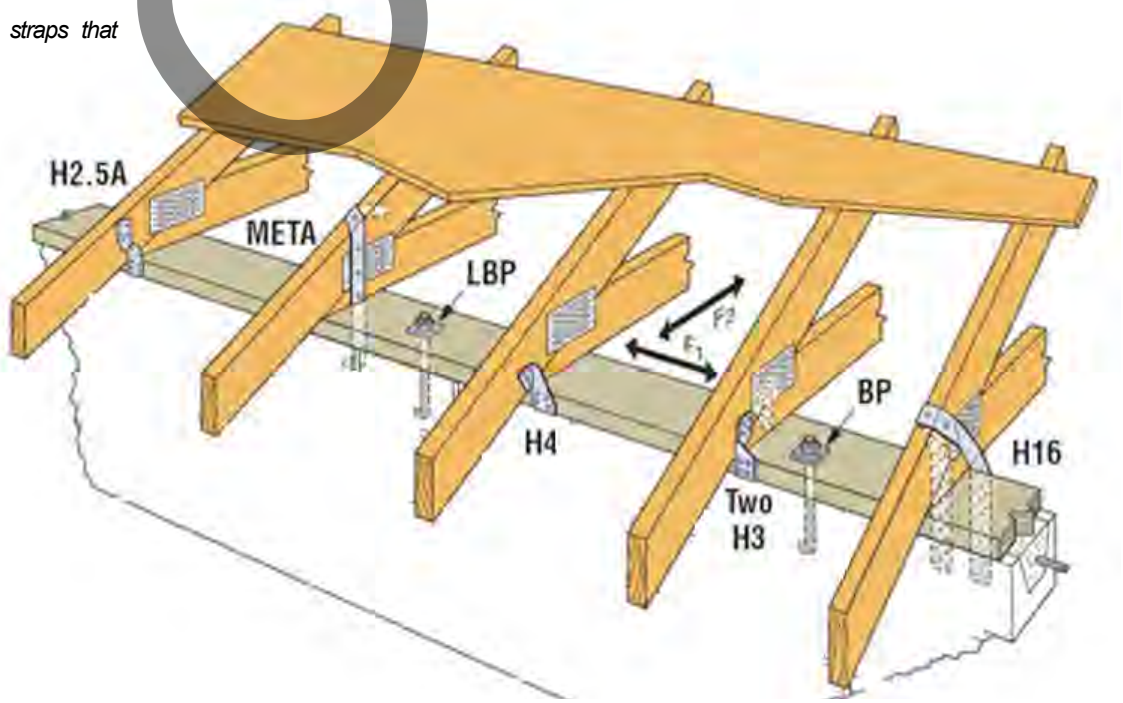
Refer also figure

1p – Structure - Details During my walk around the structural timbers appeared sound, in the areas that were readily seen. One spot check was completed in each building in areas hidden from view. The test, for durability of the structural timbers, was completed using 60mm long insulated tungsten carbide probes, driven into the timber with a sliding hammer. This leaves a 2 to 3mm hole which is usually positioned between interior wall linings. In all cases, except Tucker Hut, sound timber was encountered, as the sliding hammer took some effort to drive in the probe.

This probe was then linked to an electronic moisture meter for measurements at the center of the structural member. In roughly half the buildings moisture readings of 30% RH or more were measured. This means that the cladding system has failed. These leaks also mean that decay and the degradation of the structural timbers is inevitable unless the timber has a very high durability rating. In nearly all cases in New Zealand, structural timbers in this position do not have a high durability, however given the other aspects of pre-1950 and post-1950 construction I would not be surprised if high durability timbers were used in this case.

All junctions of wall to roof, and foundations to wall, did not meet the new building standards, and also past 1980's building standards. The timber piles to floor / wall junctions were of most concern, as a small earthquake can dislodge the building foundations from the building floor. After such an earthquake event the buildings are inhabitable as the piles puncture the floor and dislodge the floor joists. Human survival in such a building failure is common, however the corrective action required to restore the building is difficult.

Figure 1-18
BELOW Different cyclone straps that could be used for the roof



1q – Wall Cladding - Details Tucker Hut has deteriorated to such an extent that a complete rebuild is required. Refer section 2V.

Before 1950, the timber bevel back weatherboard wharf building cladding material chosen was a heart timber of some sort and most areas are in good condition. Apart from some inappropriate metal flashings, I could find no cladding decay. However with high rainfall and high humidity, painting would be problematic and this construction material would have been discouraged in future.

In the 1950's, when Beeman Base was built, the wall cladding was such a superior grade of aluminium that when un-touched, this aluminium shows no signs of oxidisation and surface decay in February 2017. Unfortunately, where the plywood shutters have been installed, these copper treated shutters are causing the premature decay of the aluminium cladding below

A few decades later, maybe between 1960 and 1990's, a pure zinc cladding was used. This cladding has extensive oxidisation and is starting to perforate. Extensive perforation is expected in the next 2 to 8 years.

Recently painted mild steel has also been used as a cladding material and extensive areas of red rust can be observed. Red rust will quickly lead to a perforated cladding.

The above four paragraphs describe a linear pattern, where the more recent cladding installed has been the least durable. Recently installed cladding now needs replacement at the same time as cladding installed in the 1950's.

Within the last few years the windows around the aluminium clad buildings have had shutters added. As discussed previously, and as explained in detail in the following section, these shutters are leading to the decay of the aluminium cladding.

Also discussed previously, the expense of transporting materials to Campbell Island, and the isolation, needs to be incorporated into the total cost of construction work, .

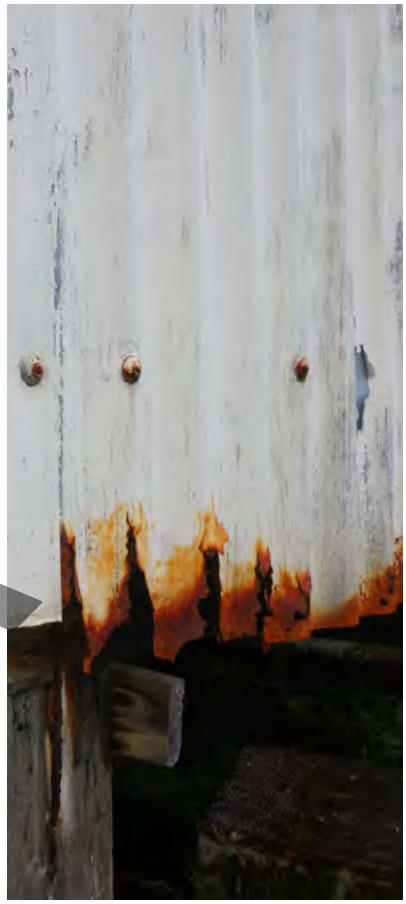


Figure 1-19
ABOVE Cladding corrosion at the base of a wall.

1r – Window Shutters - Details Anecdotal advice was that these shutters were installed by a heating engineer after one window blew out. Typically if a glass window blows out it is an unusual occurrence. It could be caused by a combination of location, near a corner of a building, and errors in measurement, the glass not being of adequate size to bite fully into the frame. Without further study, my recommendation (had I known about this incident) would be to merely replace the glass in the window concerned. Gather all the pieces of broken glass together so that the glass size could be measured, and compare this to the windows size to check if there had been any measurement error. The rest of the windows should be monitored, and if possible the glass to window size checked. Adding copper treated plywood over the windows as shutters, to protect the structural integrity of the window, has led to early cladding decay.

The installation of materials by untrained trades persons, *e.g. a heating engineer installing window shutters*, is also of concern. Correctly qualified staff would have seen the problems associated with the combination of aluminium cladding and copper plywood shutters.

Volunteers come under the same category, and it is important to ensure they are led by appropriately qualified staff with the right skills. This will ensure durability is maintained.

1s - BUILDING COMPARISON – TABULAR SUMMARY To compare buildings, I have applied three systems as a comparison:- Heritage, Condition, and Use. For Use, this is my estimate based on the limited single trip I took to Campbell island and observations of equipment inside the spaces. It assumes there is no change to the number of 600 over night stay

HERITAGE The buildings that are the most significant, that tell the story of development on the island, have received the highest rating. Recent additions have received the lowest rating. In order, highest to lowest, I would rank all buildings as follows, with 5 being of special significance, 4 high and above average significance, 3 historically significant, 2 neutral, and 1 is detrimental. In Michael Kelly's report, a 5 would equate to three highs in his heritage tables, and a 2 would equate to three lows

HERITAGE - SIGNIFICANCE	5 High High High	4 High . Significant	3 Significant	2 Low, Low Low	1 Detrimental
A Aurora house		4			
B Ionosphere hut foundations			3		
C Seismic hut foundations			3		
D Geomagnetic hut foundations			3		
E DoC Hostel				2	
F DoC Hostel Extension				2	
G Hostel – Annex				2	
H Hostel		4			
J Water tanks		4			
K New Cool Store				2	
L Carpenters Shop & Vege store		4			
M Masts and foundations		4			
M Sky Camera foundations		4			
M Chook Shed foundations		4			
N Bulk Food Store		4			
O Trolley Track				2	
P Marsden matting		4			
Q Boat Shed – Jetty ramp			3		
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Building		4			
U Jetty & Crane		4			
V Tucker Hut	5				
W Generator House				2	
X Bulk Oil Storage				2	
Y Hydrogen Building		4			
Z Climatological Enclosure		4			

building use table

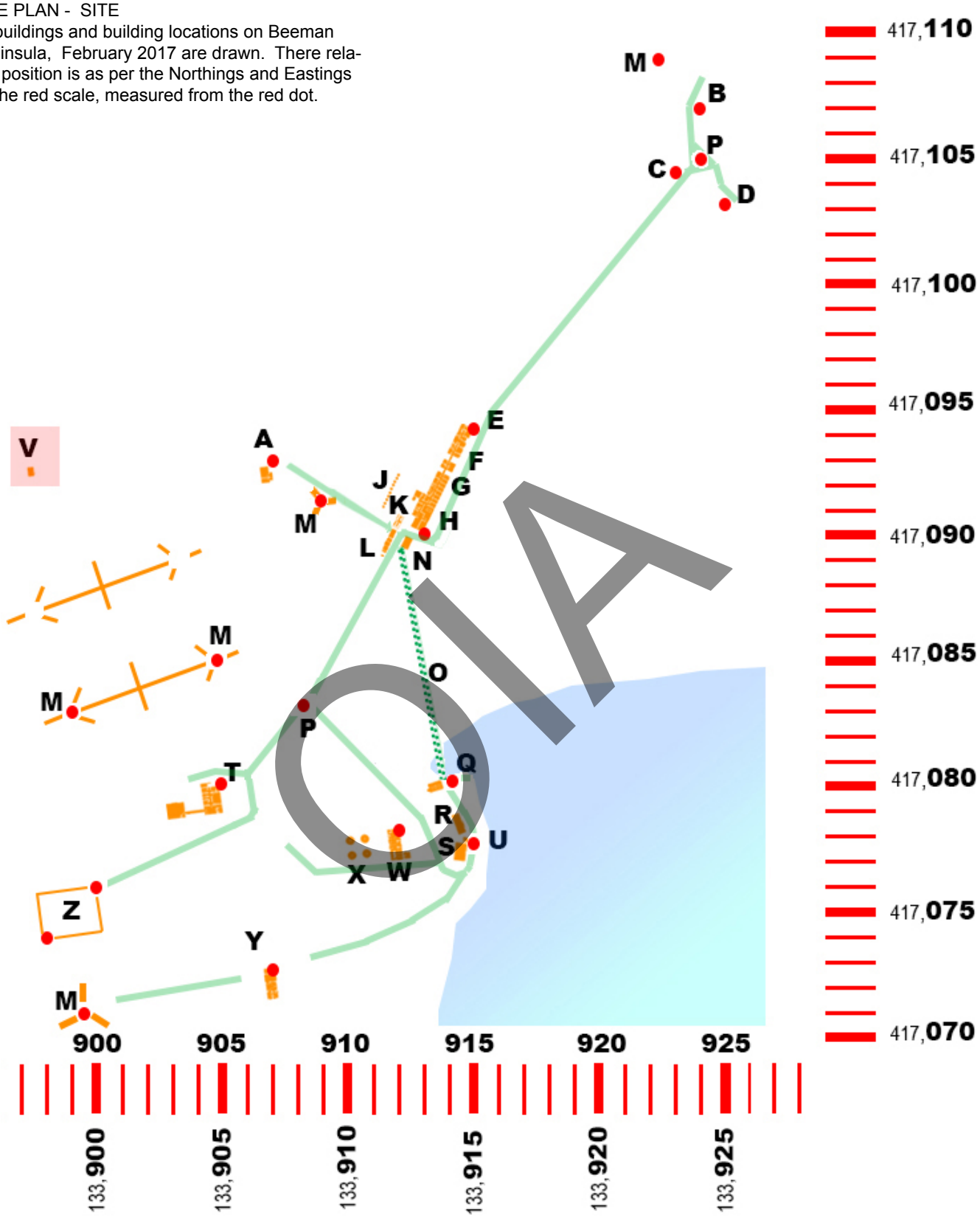
CONDITION The buildings that are in the best condition. In order, highest to lowest, I would rank all buildings as follows with :- 5, being of as new condition meeting the Present Building Codes (PBC); 4, Close to the PBC and some maintenance is required; 3 re-cladding is required soon; 2 close to derelict; and 1 ground work and clearing of scrub, and interpretative signs, are the only required.

CONDITION – Close compliance to - Present Building Codes PBC	5 Meets PBC	4 Close to PBC. Maintenance required	3 Recladding work required	2 Close to derelict	1 Ground work only required
A Aurora House			3		
B Ionosphere hut foundations					1
C Seismic hut foundations					1
D Geomagnetic hut foundations					1
E DoC Hostel			3		
F DoC Hostel Extension			3		
G Hostel – Annex			3		
H Hostel		4			
J Water tanks			3		
K New Cool Store		4			
L Carpenters Shop & Vege store		4			
M Masts and foundations					1
M Sky Camera foundations			3		
M Chook Shed foundations					1
N Bulk Food Store			3		
O Trolley Tarck				2	
P Marsden matting				2	
Q Boat Shed – Jetty ramp		4			
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Building		4			
U Jetty & Crane					
V Tucker Hut				2	
W Generator House		4			
X Bulk Oil Storage			3		
Y Hydrogen Building				2	
Z Climatological Enclosure					1

USE The buildings that are required, from my single trip, are ranked. In order, highest to lowest, I would rank all buildings as follows, with 5 showing use all year around, 4 showing some signs of recent intermittent occupation, column 3 is not used, 2 indicates little use, and 1 the area is derelict or un-useable.

USE As of Feb 2017	5 Required year around	4 Used, Feb 2017	3 Able to be used, but no evidence of use.	2 Derelict	1 Not ap-plicable
A Aurora house			3		
B Ionosphere hut foundations					1
C Seismic hut foundations					1
D Geomagnetic hut foundations					1
E DoC Hostel		4			
F DoC Hostel Extension			3		
G Hostel – Annex			3		
H Hostel			3		
J Water tanks		4			
K New Cool Store			3		
L Carpenters Shop & Vege store		4			
M Masts and foundations					1
M Sky Camera foundations					1
M Chook Shed foundations					1
N Bulk Food Store			3		
O Trolley Track		4			
P Marsden matting		4			
Q Boat Shed – Jetty ramp		4			
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Build – generally			3		
T Technical Build – Climate gear	5				
U Jetty Crane			3		
V Tucker Hut				2	
W Generator House			3		1
X Bulk Oil Storage			3		1
Y Hydrogen Building				2	1
Z Climatological Enclosure	5				1

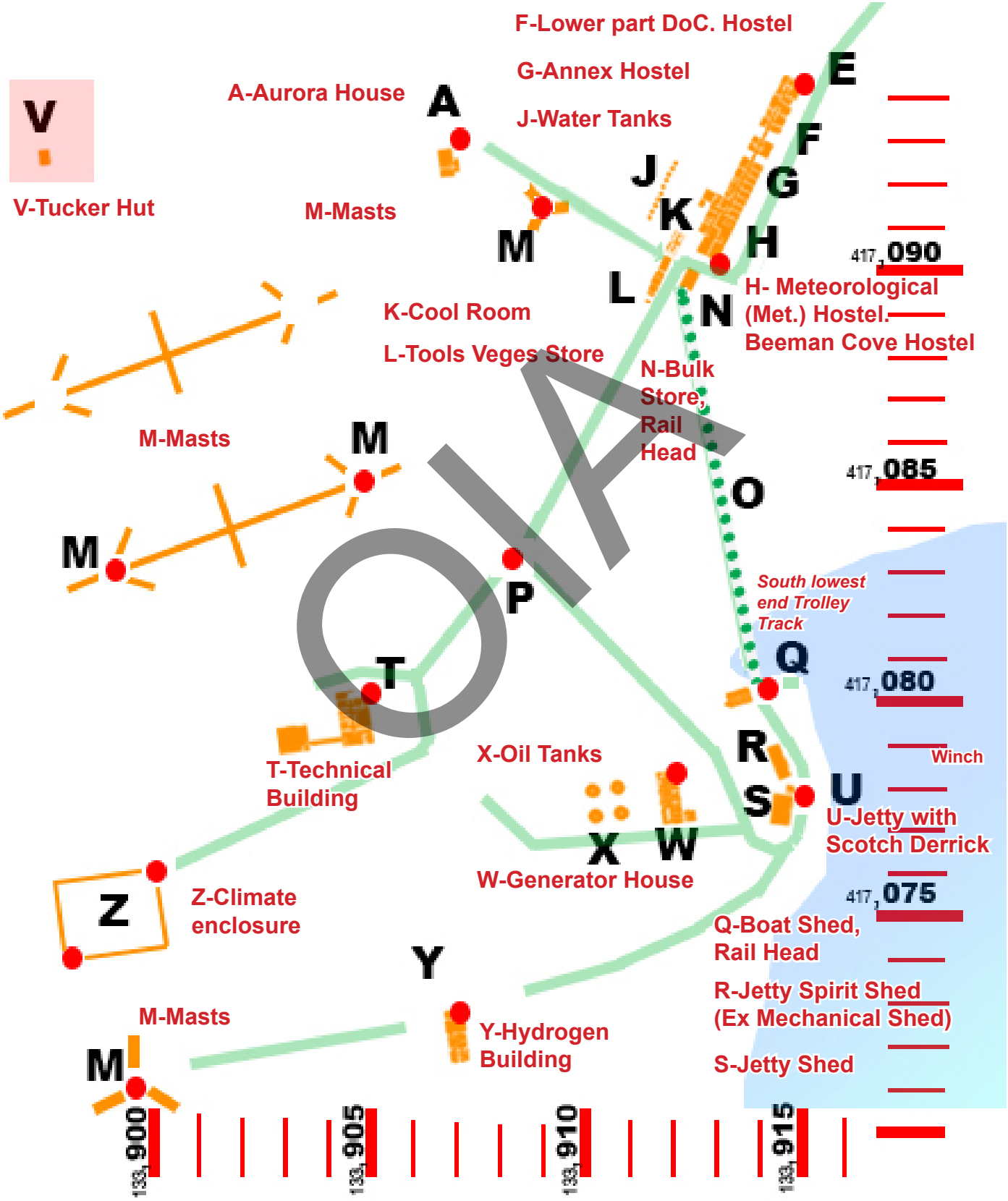
SITE PLAN - SITE
All buildings and building locations on Beeman Peninsula, February 2017 are drawn. There relative position is as per the Northings and Eastings on the red scale, measured from the red dot.



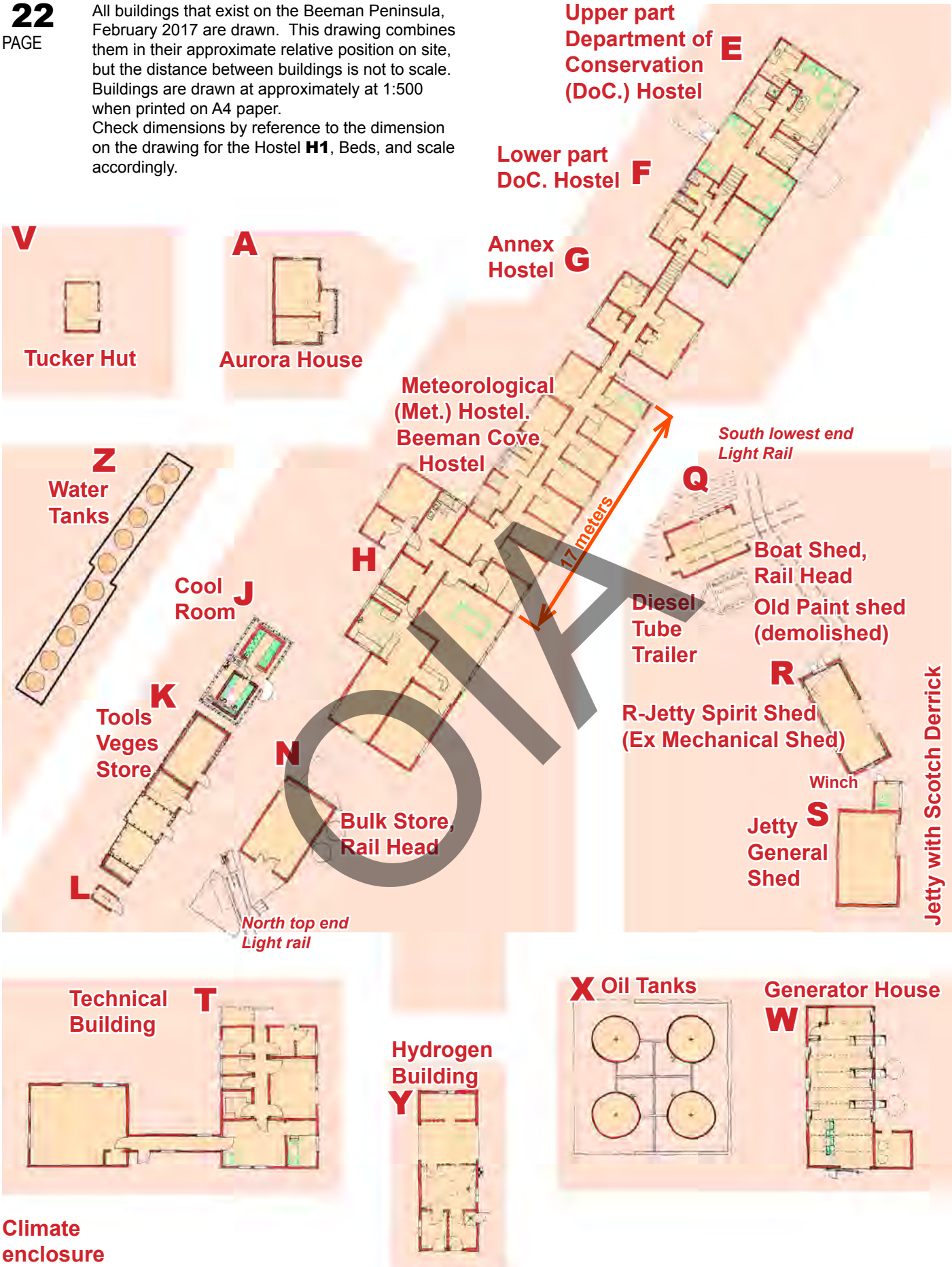
SITE PLAN - SITE
Table of the Northings and Eastings, on the previous site plan.
Letters in the far right hand column correspond to the letters on the plan.
The yellow highlight shows different ways of measuring the same point, as reviewed by Land Information (LINZ)

Campbell Island GPS readings. DoC New Plymouth GPS	File 1601-E-Site Plans Northing	Easting	
Iono Mast	417 1092	133 9224	M
Ionoshere Hut	417 1076	133 9248	B
Triangular track traffic island	417 1052	133 9242	P
Magneto Hut	417 1037	133 9251	D
Seismic Hut	417 1047	133 9229	C
DoC Hut, NE corner	417 0954	133 9169	E
DoC Hut, 2 hours later	417 0946	133 9158	E
Hostel -Met Accom, SE Corner	417 0902	133 9136	H
Green aerial to Aurora Hut	417 0909	133 9107	M
Aurora Hut, NE corner	417 0930	133 9075	A
Technical Building, NE corner	417 0807	133 9055	T
Main Track "Y" junction	417 0833	133 9089	P
Ano Mast	417 0710	133 8989	M
Jetty Store, NE corner	417 0777	133 9151	S
Generator Shed, NE corner	417 0786	133 9127	W
Hydro Generator shed, NE crn	417 0725	133 9071	Y
Boat ramp rail track Trident junction-DoC WGS-84	417 0807	133 9138	Q
Topo Map 169deg09'08"		52deg33'00"	
LINZ NE-ings Campbell Island Mercator System	417 5400	351 0300	
Comms mast to NZ, Main mast SE	417 0840	133 9051	M
Comms mast to NZ, Main mast SW	417 0834	133 8985	M
Met Climate Instrument square, NE crn	417 0765	133 8998	Z
Met Climate Instrument square, SW crn	417 0740	133 8971	Z

SITE PLAN - BUILDINGS
All buildings that exist on the Beeman Peninsula, February 2017 are drawn. There relative position is as per the Northings and Eastings on the red scale.



All buildings that exist on the Beeman Peninsula, February 2017 are drawn. This drawing combines them in their approximate relative position on site, but the distance between buildings is not to scale. Buildings are drawn at approximately at 1:500 when printed on A4 paper.
Check dimensions by reference to the dimension on the drawing for the Hostel **H1**, Beds, and scale accordingly.



building stock

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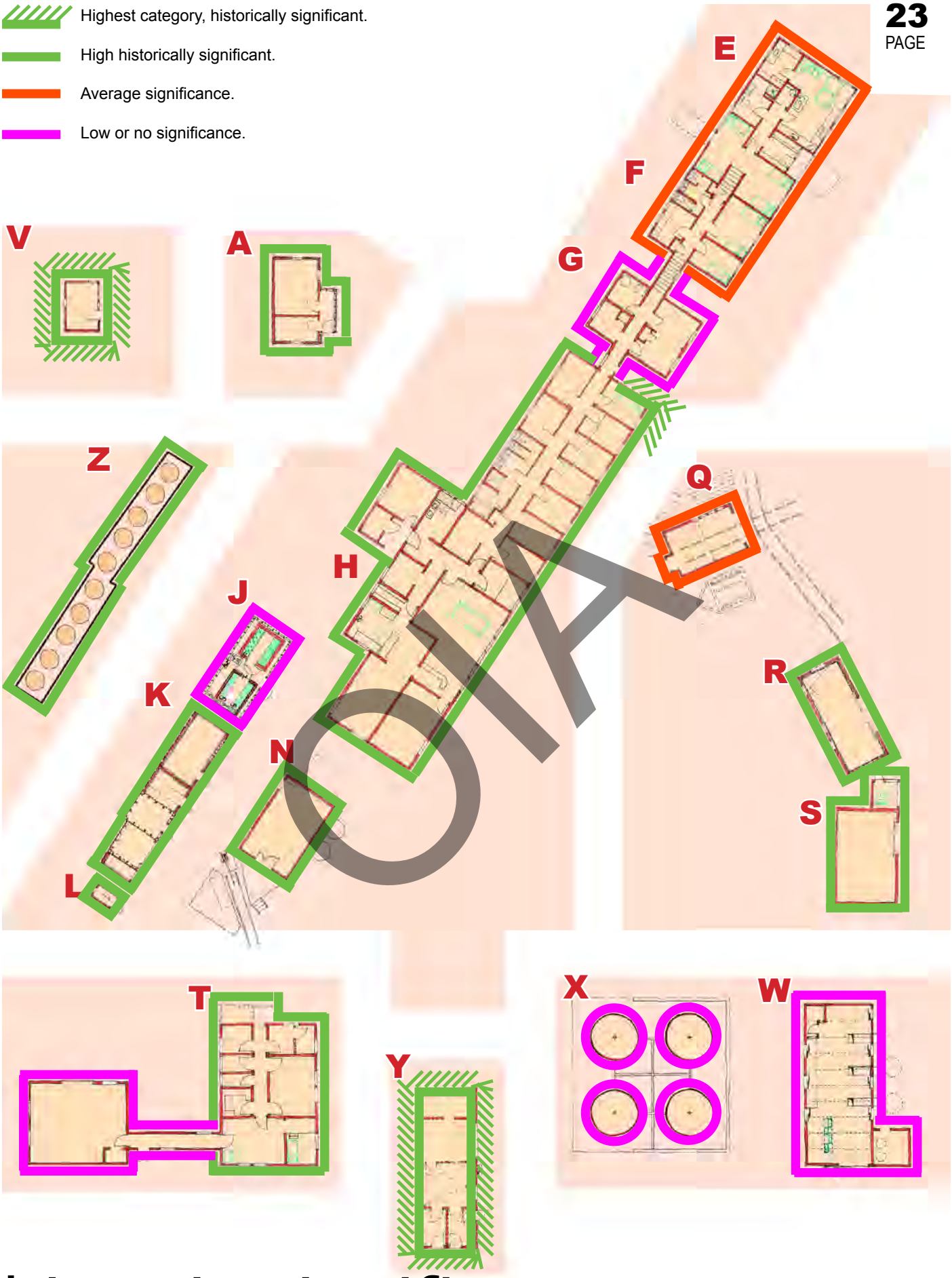
campbell island-METEOROLOGICAL STATION

Highest category, historically significant.

High historically significant.

Average significance.

Low or no significance.



historic significance

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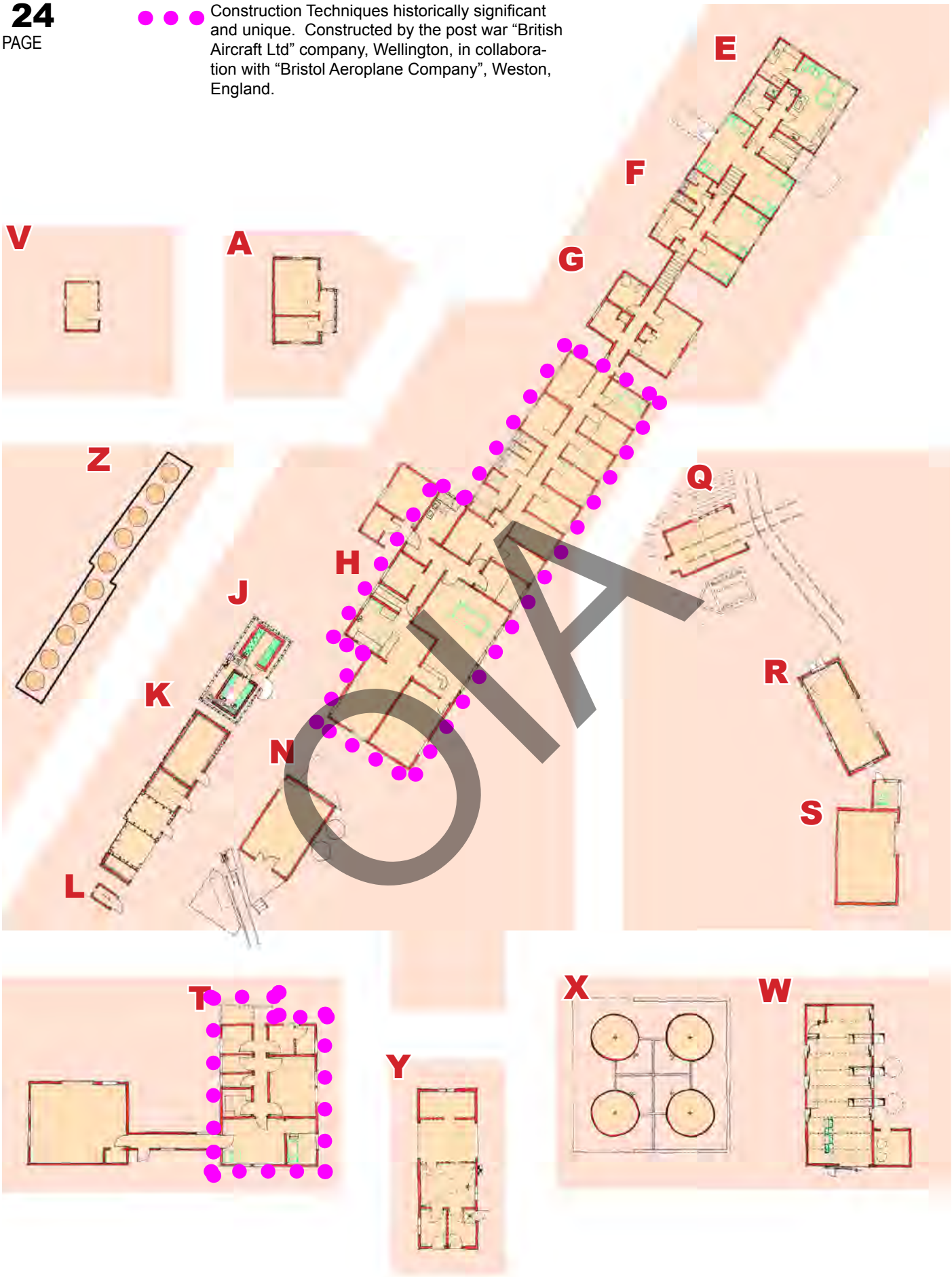
campbell island-METEOROLOGICAL STATION

Construction Techniques historically significant and unique. Constructed by the post war “British Aircraft Ltd” company, Wellington, in collaboration with “Bristol Aeroplane Company”, Weston, England.



unique construction

Near to demolished by neglect.

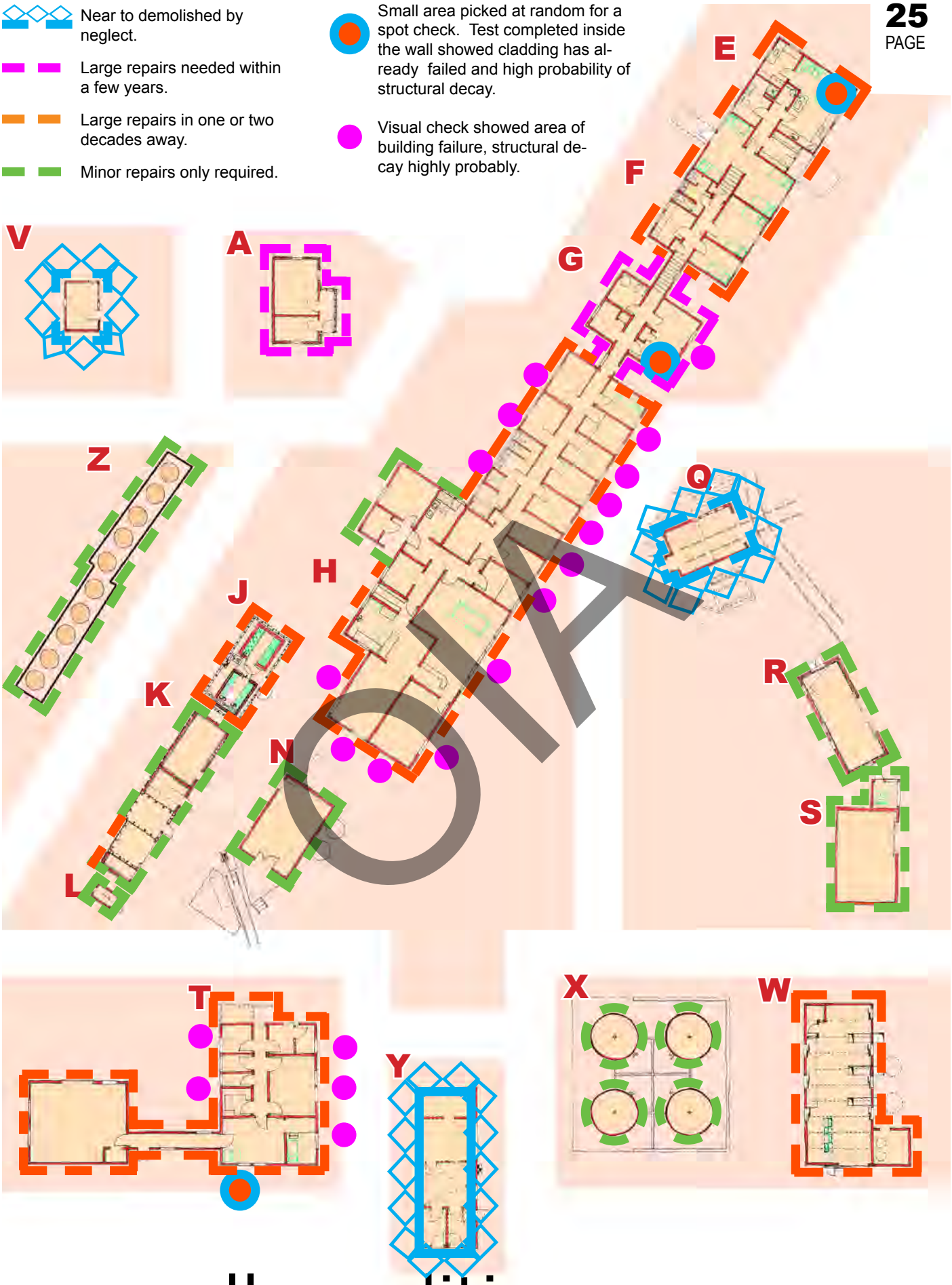
Large repairs needed within a few years.

Large repairs in one or two decades away.

Minor repairs only required.

Small area picked at random for a spot check. Test completed inside the wall showed cladding has already failed and high probability of structural decay.

Visual check showed area of building failure, structural decay highly probably.



wall condition

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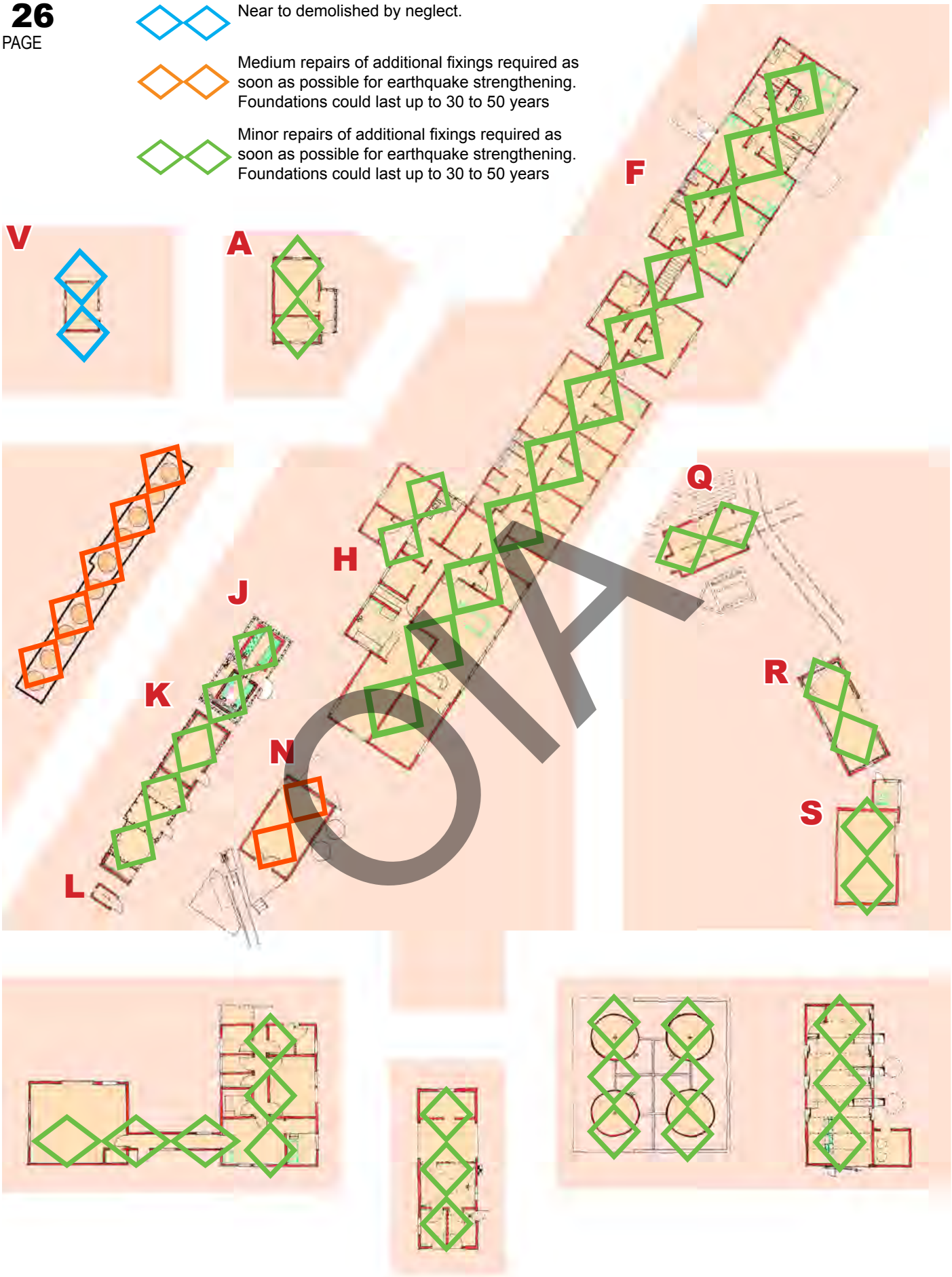
campbell island - METEOROLOGICAL STATION

Near to demolished by neglect.

Medium repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years

Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years



foundation condition

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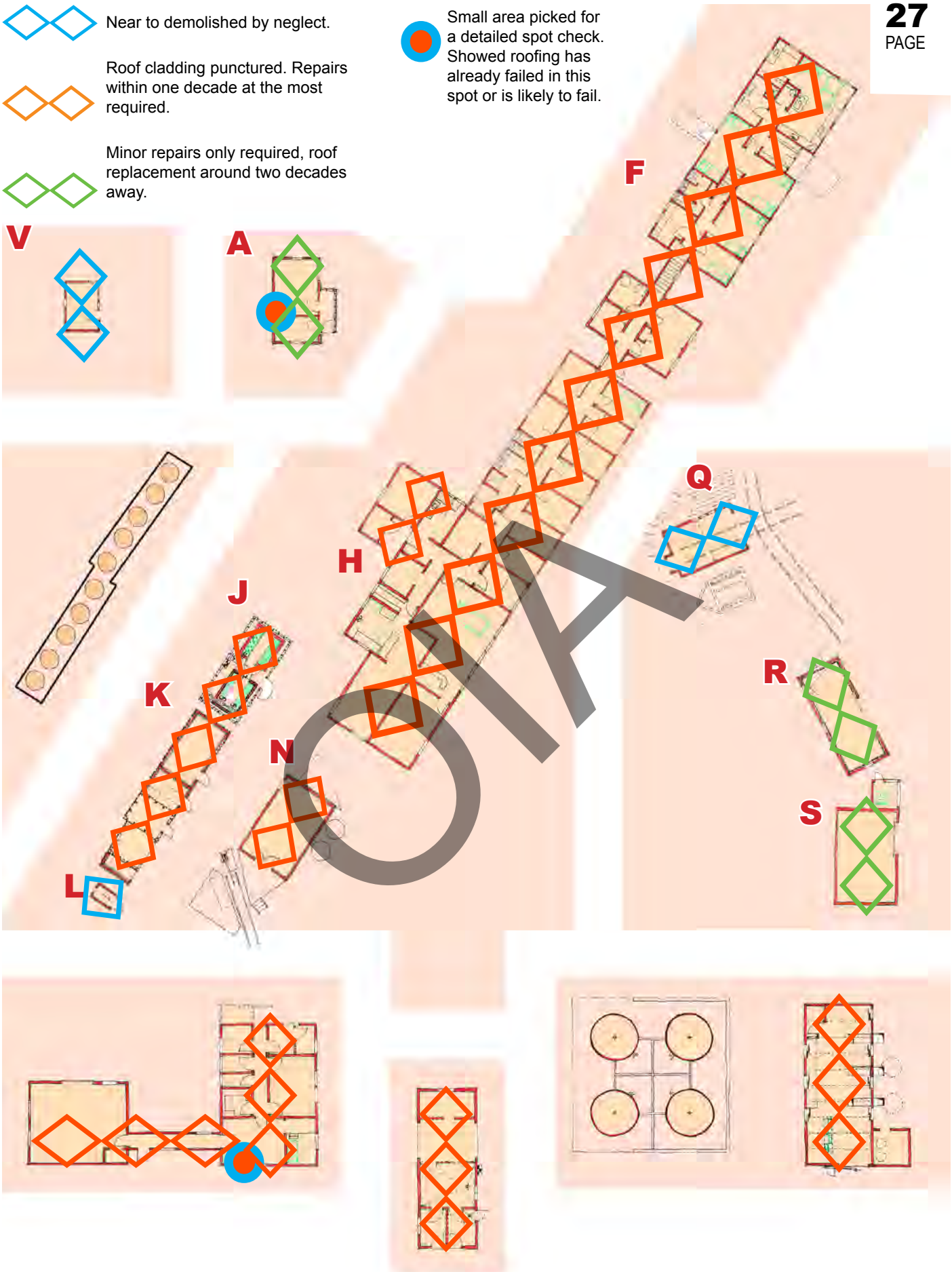
campbell island-METEOROLOGICAL STATION

Near to demolished by neglect.

Roof cladding punctured. Repairs within one decade at the most required.

Minor repairs only required, roof replacement around two decades away.

Small area picked for a detailed spot check. Showed roofing has already failed in this spot or is likely to fail.



roof condition

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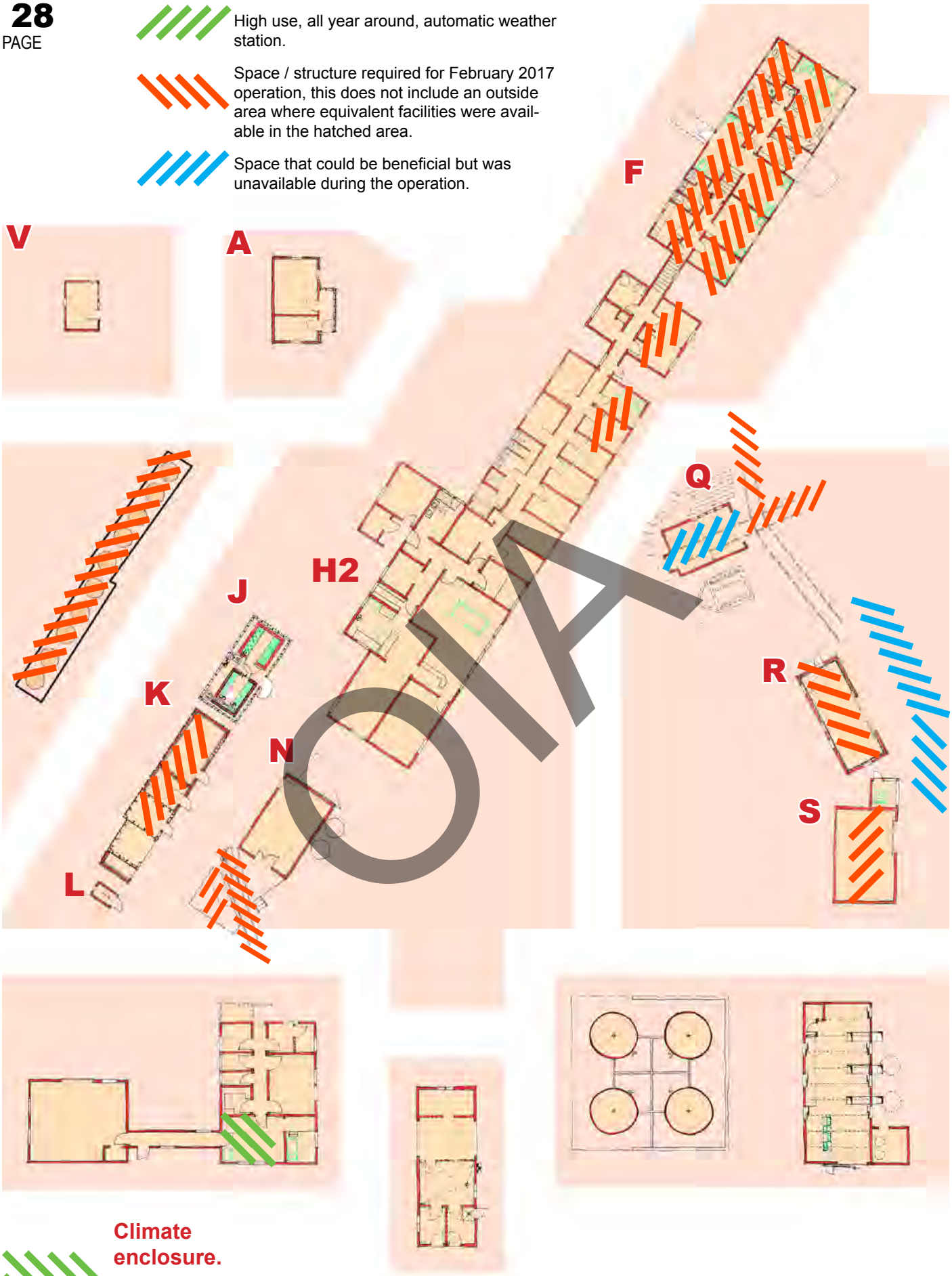
campbell island-METEOROLOGICAL STATION

High use, all year around, automatic weather station.

Space / structure required for February 2017 operation, this does not include an outside area where equivalent facilities were available in the hatched area.

Space that could be beneficial but was unavailable during the operation.



Climate enclosure.

SUMMAR 1

use, feb. 2017

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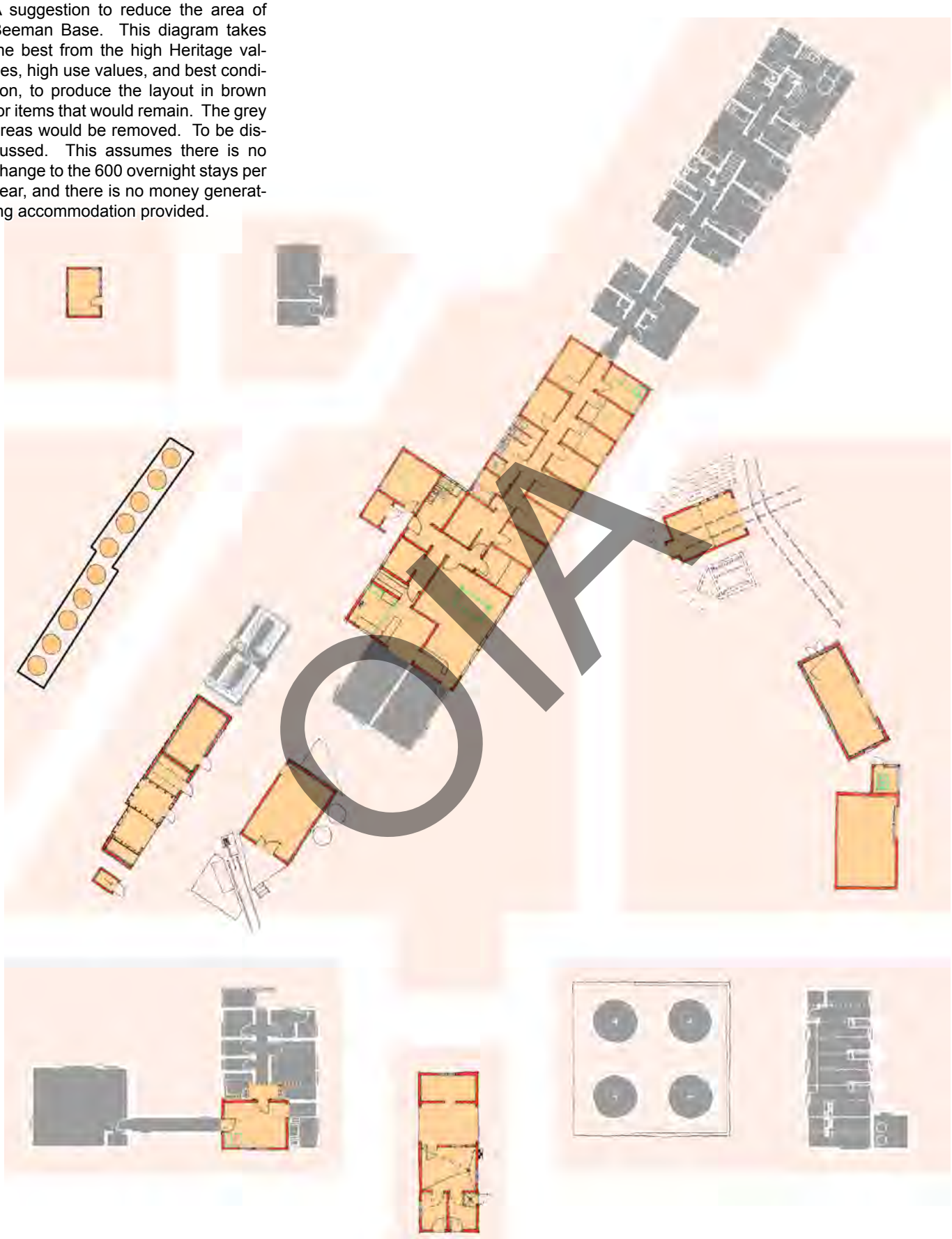
campbell island-METEOROLOGICAL STATION

SUGGESTED USE. For discussion. A suggestion to reduce the area of Beeman Base. This diagram takes the best from the high Heritage values, high use values, and best condition, to produce the layout in brown for items that would remain. The grey areas would be removed. To be discussed. This assumes there is no change to the 600 overnight stays per year, and there is no money generating accommodation provided.



suggested use

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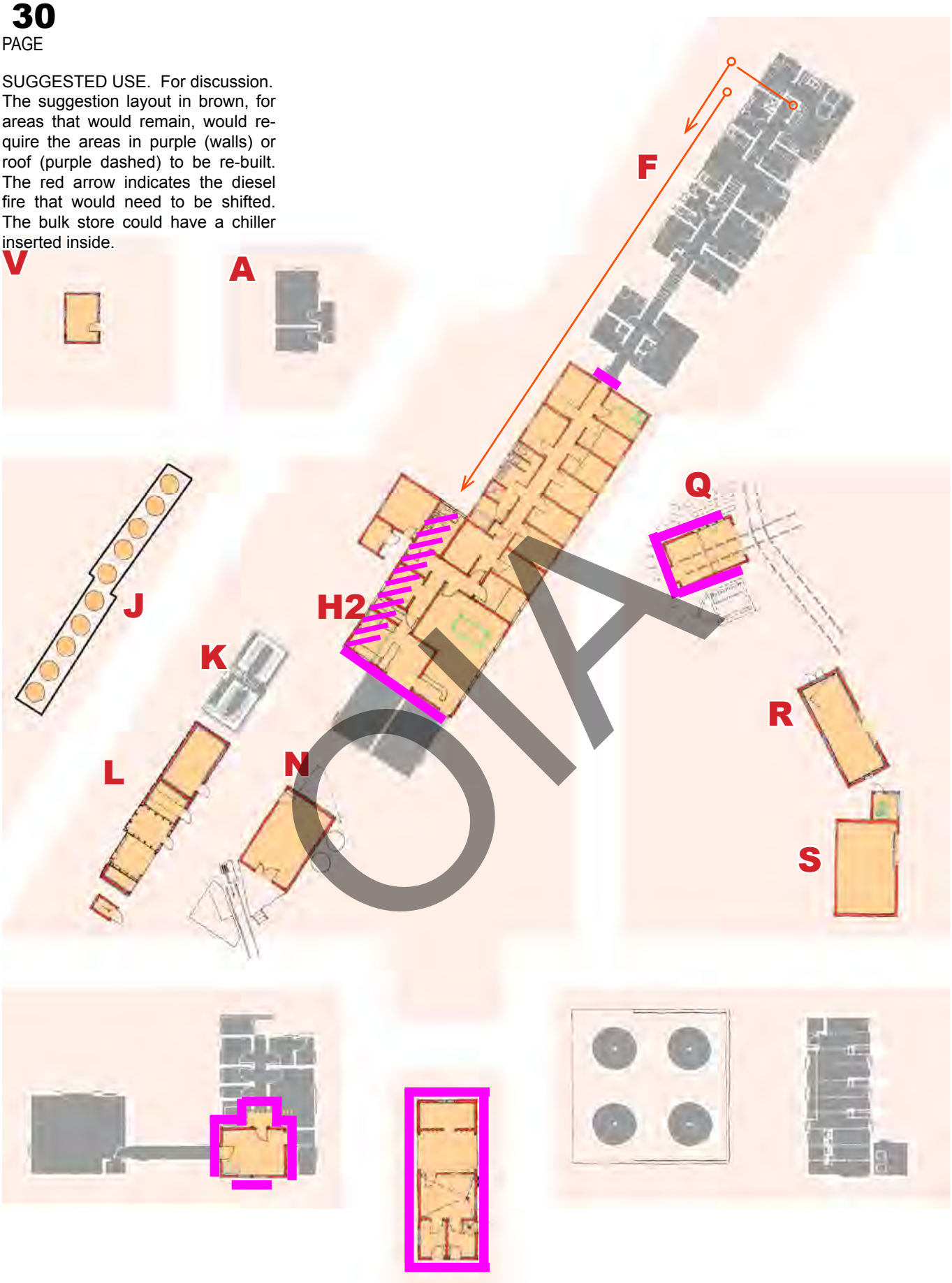
campbell island - METEOROLOGICAL STATION

SUGGESTED USE. For discussion. The suggestion layout in brown, for areas that would remain, would require the areas in purple (walls) or roof (purple dashed) to be re-built. The red arrow indicates the diesel fire that would need to be shifted. The bulk store could have a chiller inserted inside.



work required for use

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campbell island-METEOROLOGICAL STATION

2.0 CONDITION

The following section comments on the condition of each building.

Numbered as per the site plan on the following page.

The red box to the right is a one meter scale, so that the photos can be used for measurement. As photos are at slightly different sizes the scales will alter with every photo, and also alter due to perspective. Generally photos are taken to reduce the effects of perspective as much as possible.

The two bottom sections of the scale in the photos is accurate for one metre, however the top section needed to be truncated and is 800mm high

The table of huts, letter to hut name, is listed on the following page.

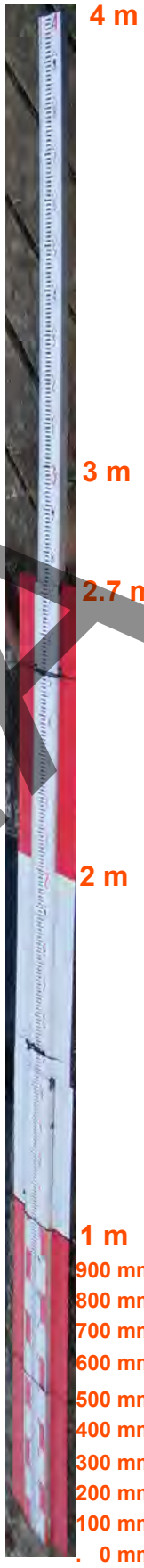
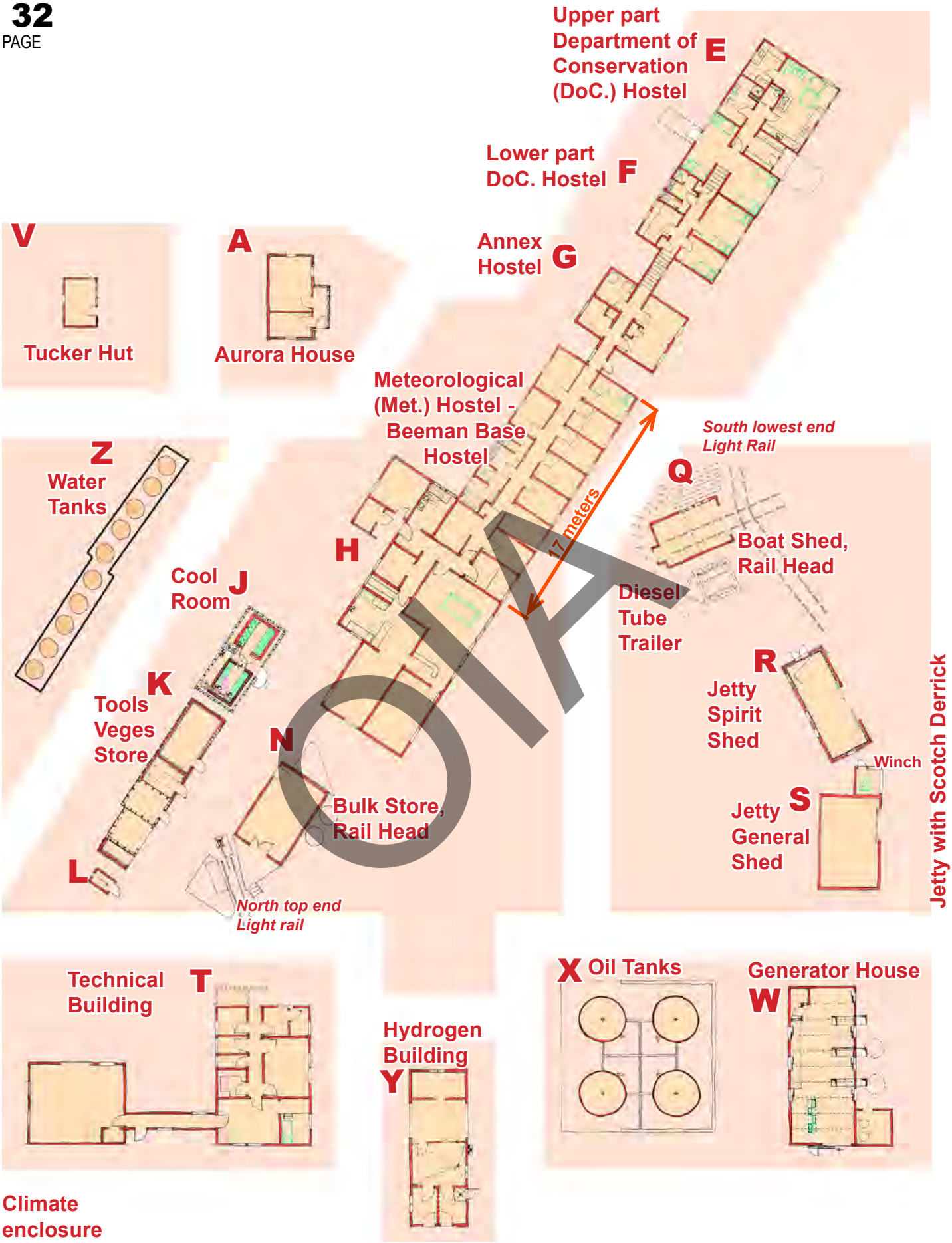


Figure 2-1
ABOVE Corrosion evident on numerous cladding materials

Figure 2-2
LEFT Condition of the historically and most highly significant building, the Tucker Hut.



building codes

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campbell island - METEOROLOGICAL STATION .

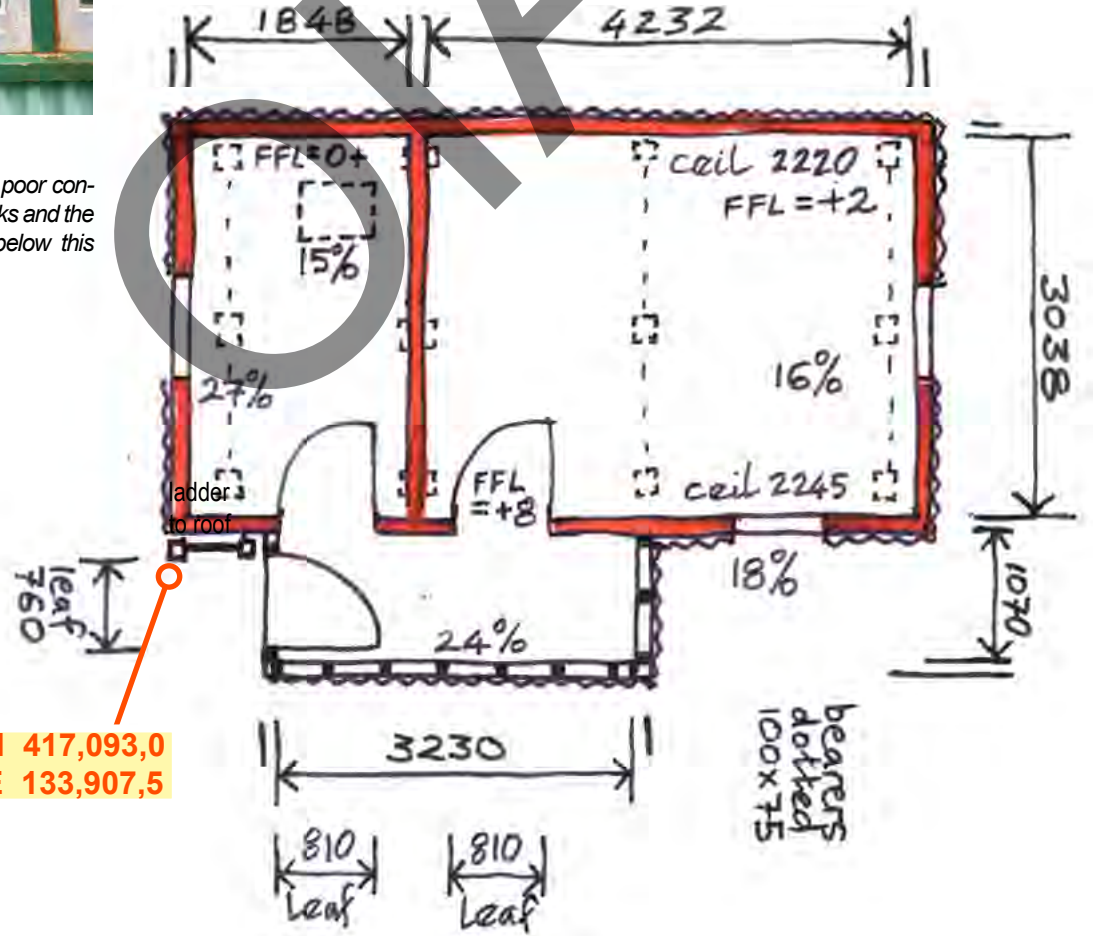
CONDITION 2

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Large repairs needed within a few years. Test completed inside the wall showed cladding has already failed and high probability of structural decay.
Foundation condition	Foundations could last up to 30 to 50 years Minor repairs of additional fixings required
Roof condition	Minor repairs required,
Use, Feb 2017	No use during February 2017.

Figure A1 ; A2 ; A3 ; A4
The four elevations of Aurora Hut.
The patches are where the plastic cladding, added over the previous, have cracked and deteriorating.
The timber cladding below was leaking before the plastic over -clad.

Figure A5
ABOVE -The south window, in poor condition. This will be leading to leaks and the high moisture content (27%) below this window.

Figure A6
RIGHT -Aurora Floor Plan



N 417,093,0
E 133,907,5

aurora hut

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campbell island-METEOROLOGICAL STATION .

CONDITION 2A

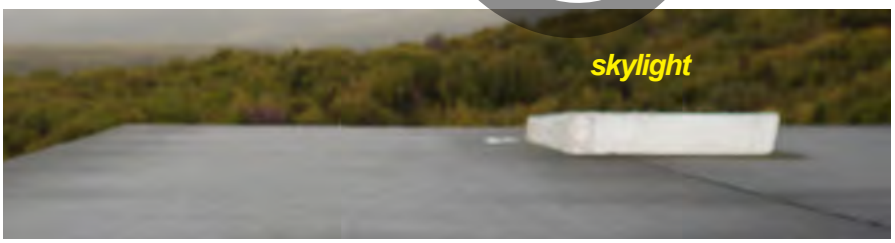

Figure A8 ; A9 ; A10
The roof membrane is in good condition, but very poor detailing around all the edges means that the roof will leak &/or peel off in high winds.
The skylight has no upstand and this will lead to inevitable decay if no corrective action is completed.

Figure A7
TOP The foundations "as is" and BOTTOM the position of the additional stub stud required is drawn in yellow below. This will assist in earthquake resilience.

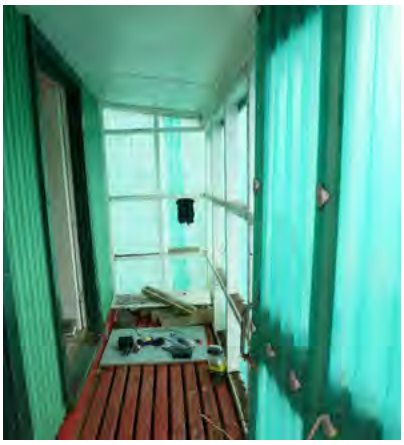

Figure A11
ABOVE The open porch

Figure A12
ABOVE RIGHT - The smaller room, with the leaking window to the left. The skylight is above the desk.

Figure A13
RIGHT -The larger room

Historic significance	Average significance.
Foundation condition	Regular mowing would assist with interpretation

Figure B1
AZIMUTH HILL ROCK
MOUBRAY - LYALL
BEEMAN
N'EAST H'BOUR

Figure B2
The location of the Ionosphere Hut, at the end of Ionosphere way. Photo taken from near the path "Y" junction to the geomagnetic hut location.

ionosphere hut

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campbell island-METEOROLOGICAL STATION

2B CONDITION

N 417,105,2
E 133,924,2

Historic significance — Average significance.
Foundation condition — Regular mowing would assist with interpretation

CLIFTON MEMORIAL
GEOMAGNETIC OBSERVATORY

Figure C1
ABOVE The "Clifton Memorial" sign at the end of "Ionosphere way" just past the location of the Seismic Hut. The text of the sign, just visible, is printed to the left.

N 417,104,7
E 133,922,9

Figure C2
ABOVE The end of "Ionosphere way" The seismic hut location is on the left.

CONDITION 2C

seismic hut

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campbell island-METEOROLOGICAL STATION

Figure D1
RIGHT "Clifton Memorial" sign. Letters underlined are hard to read
IN MEMORY OF
LESLIE CLIFTON
DIED IN AN AIRCRAFT ACCIDENT
NEW ZEALAND 1951
LEADER OF CAPE EXPEDITION
1942
MINING ENGINEER - SURVEYOR

Figure D2
RIGHT Still visible are the Tripod measuring instrument stands that were below the geomagnetic hut floor.

Figure D3
BELOW The Geomagnetic Hut excavation.

Figure D3
FAR RIGHT Plan of the foundations of the Geomagnetic Observatory foundations
Footprint, approximately 3.0m high.

geomagnetic observ.

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campbell island-METEOROLOGICAL STATION

2D CONDITION

Historic significance	Low or no significance.
Construction	Standard New Zealand wide common construction techniques

Wall condition
Re-cladding needed within one decade. Zinc wall cladding shows extensive areas of white rust. Visual checks showed areas of cladding where failure will occur soon, then decay of structural members inside wall highly probable. Time period of structural failure depends on durability of timber.
Test completed inside the wall showed elevated moisture around recently installed window. This recent additional work has already failed with a high probability of structural decay inside wall. Repairs here required now. No faults or decay found with original aluminium window installation installed decades previously. Decay inside wall depends on durability of timber.

Foundation condition
Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years. The partical board flooring has a limited life as it is exposed to intermittent high moisture levels.

Roof condition Roof cladding punctured and repairs required now. Re-cladding required within one decade at the most. Minor repairs required. A small area was spot checked in detail, this showed roofing already failed in this spot

Use, Feb 2017 Space required for February 2017

Figure E1
Hostel, DoC end. The original alum windows are brown, and the assumption is that the recently added timber windows, (which are leaking) are white

Figure E2
LEFT TOP. Hostel, DoC end. The recently added timber window which is leaking is white

Figure E3
LEFT MID. Diesel fire equipment on the left.

Figure E4
LEFT BELOW. Water tanks and feed.

Figure E5
BELOW. Connection to space F, with barge boards missing. This will lead to decay.

dept. conserv. hut

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campbell island-METEOROLOGICAL STATION

2E CONDITION

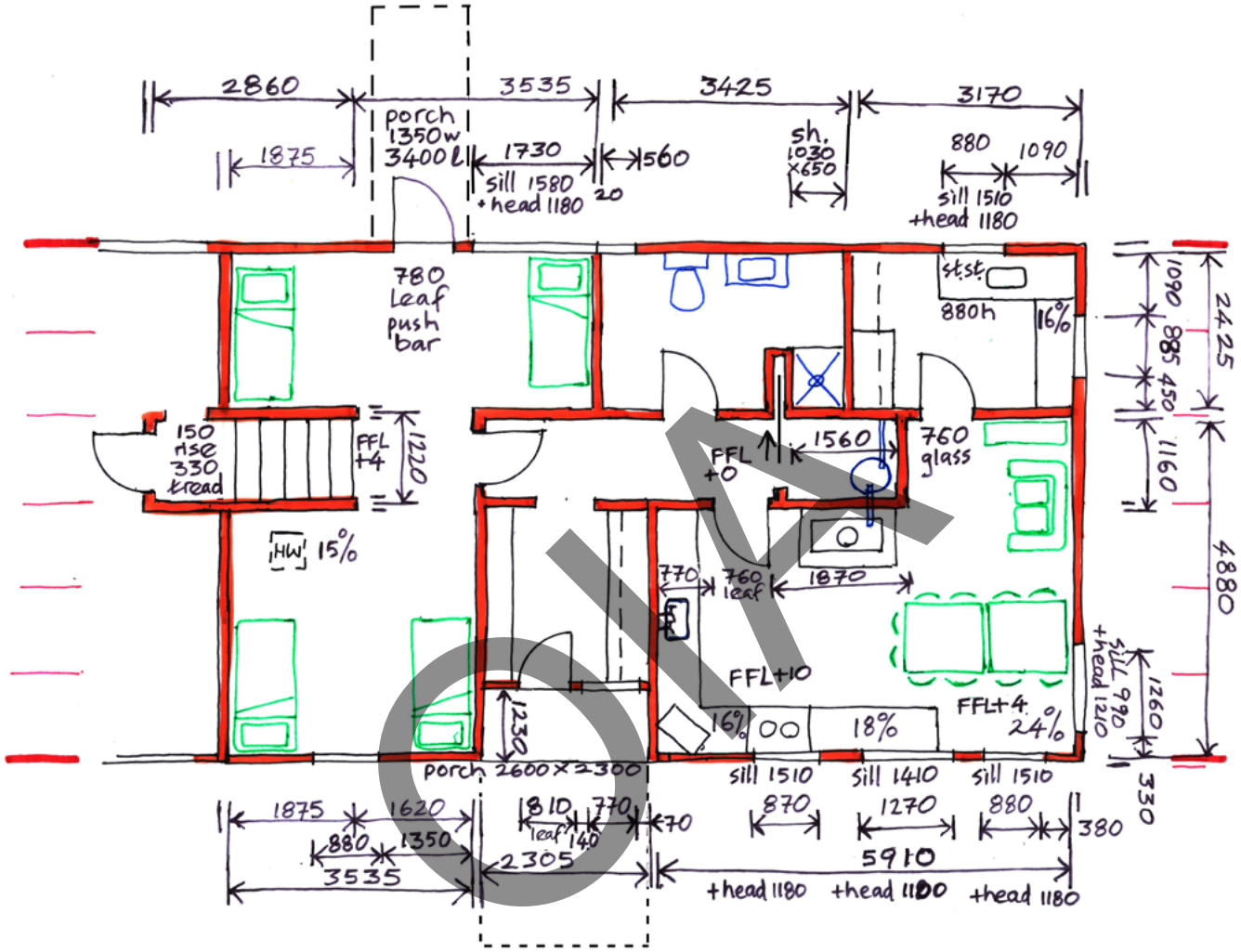


Figure E6
Hostel, DoC end. The leaking window is in the bottom right hand side of the plan, where internal framing moisture content was recorded at 24%. Readings for dry construction in the Campbell Island environment should be 15% to 16%.

Items drawn in green are removable furniture.

Figure E7
LEFT TOP. Foundations of all Hostel Huts, showing requirement for earthquake strengthening in red, where a stub stud is required.

Figure E8
RIGHT TOP. Checks for ferrous material, with an industrial magnet. The product tested was non ferrous and most likely a pure zinc

Figure E9
LEFT. Condition of underside of particle board flooring

Figure E10
LEFT BELOW. Timber window, sill, where leaks will be testing the durability of the framing .

Figure E11
LEFT BELOW. Same window showing the window head

Figure E12
LEFT TOP. Incorrect flashing materials were used when installing the Diesel fire, and this material has already perforated and the durability of the timber truss will need to be checked. Rest of roof generally in acceptable condition.

Figure E13
RIGHT BELOW. Condition of cladding, where the white areas are white rust, or Zinc oxidisation. This is the start of a process that leads to cladding perforation

Figure E14
TOP BELOW. Isolated perforation of Zinc cladding.

Figure E15
BOTTOM BELOW. Isolated perforation of Zinc cladding.

ITEMS IN SECTION **2E** APPLY IN THIS SECTION **2F**

Historic significance Low or no significance.

Construction Standard New Zealand wide common construction techniques

Wall condition

Re-cladding needed within one decade. Zinc wall cladding shows extensive areas of white rust. Visual checks showed areas of cladding where failure will occur soon, then decay of structural members inside wall highly probable. Time period of structural failure depends on durability of timber.

No faults or decay found with original aluminium window installation installed decades previously.

Foundation condition

Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years. The particle board flooring has a limited life as it is exposed to intermittent high moisture levels.

Roof condition

Re-cladding required within one decade at the most.

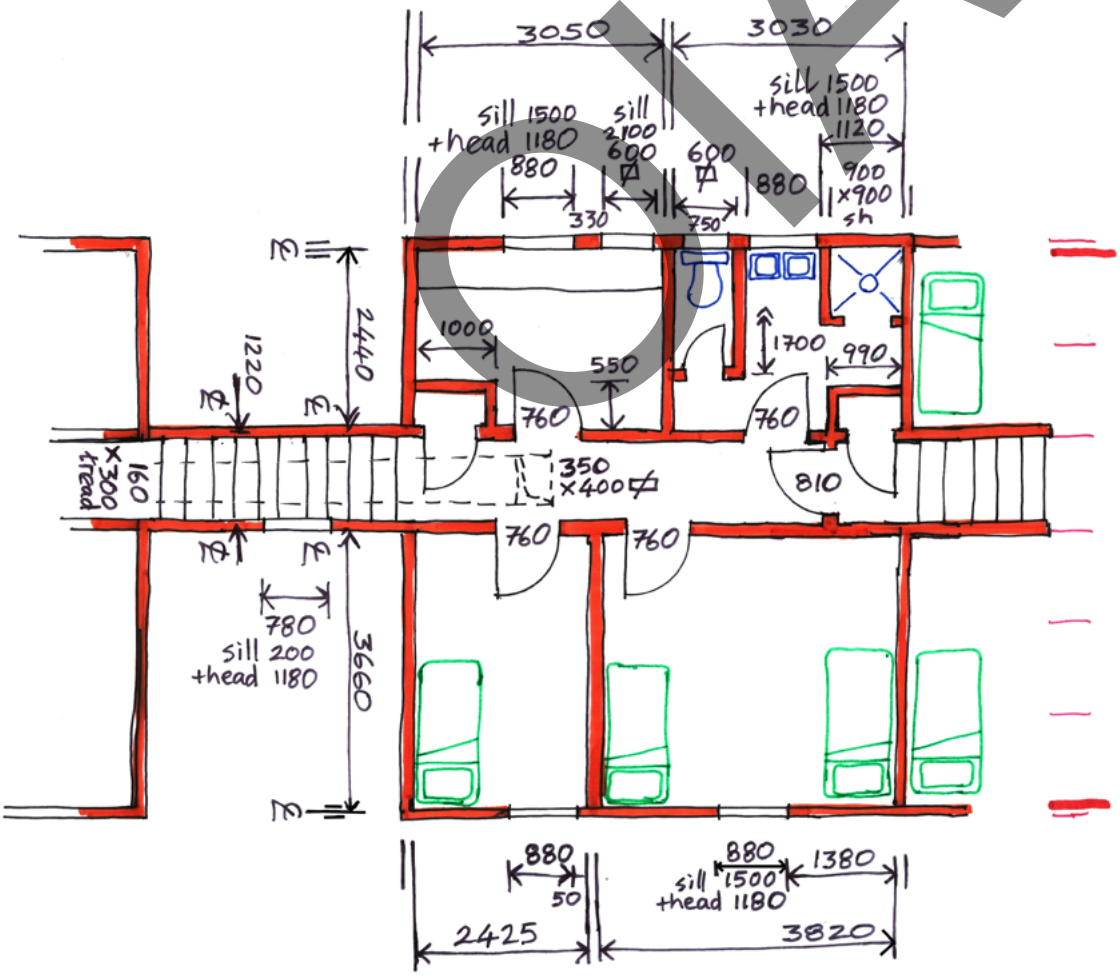
Minor repairs required, for example around the barge. Roofing already failed in this spot

Use, Feb. 2017 Space required for February 2017

Figure F1
LEFT Department of Conservation sleeping annex. East elevation.

Figure F1
LEFT. Department of Conservation sleeping annex. West elevation.

Figure F2
BELOW. Floor Plan, with items drawn in green being removable furniture.



CONDITION 2F

D.o.C. annex

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campbell island-METEOROLOGICAL STATION

ITEMS IN SECTION **2E** APPLY IN THIS SECTION **2F**

Historic significance Low or no significance.

Construction Standard New Zealand wide common construction techniques

Wall condition

Re-cladding needed within a few years, and less than five years. Aluminium wall cladding shows extensive areas of white rust and some areas have already perforated. This cladding where failure will occur soon or has started to occur, will decay the structural members inside. Time period of structural failure depends on durability of timber.

Foundation condition

Assume minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations not checked.

Roof condition

Re-cladding required within one decade at the most.

Use, Feb. 2017 Space partially used in February 2017

Figure G1
ABOVE Hostel sleeping annex. West elevation.

Figure G2
BELOW. Hostel sleeping annex. East elevation.

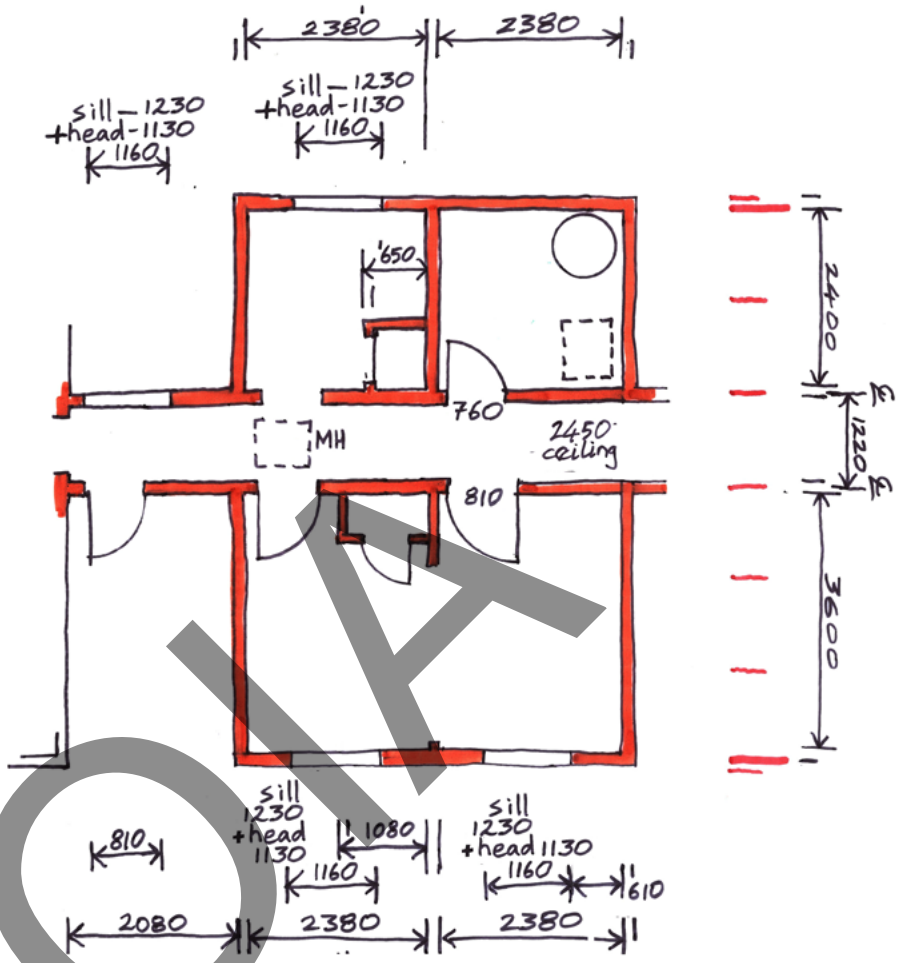

Figure G3
RIGHT -Hostel sleeping annex plan.

Figure G4 ; G5 ; G6
BELOW Examples of corrosion of the inferior grade of aluminium used as a cladding on the annex building. Perforation of the cladding has already occurred.
The grade of aluminium installed on the main hostel has little signs of corrosion or oxidisation, even though it has been exposed in this environment for a decade or longer than the grade of aluminium used on the annex.

Historic significance	High historically significant.
Construction	Techniques historically significant and unique.

Wall condition
Large repairs to the cladding required generally around two decades away.
Minor repairs required within the next year to the plywood copper treated shutters that cover the windows and leach copper over the aluminium below.
Small area picked at random for a spot check and no areas of decay found.

Foundation condition
Foundations could last up to 30 to 50 years.
Additional fixings required as soon as possible for earthquake strengthening between the timber piles and the bearers.

Roof condition
Roof cladding is generally in good order, however, replacement could be required in one to two decades.
Small areas of roofing have already failed and require remedial action next year.
A part of an addition to the original Hostel was installed so that the roof had a negative slope. Here any rain water will not flow off the roof, but collect until the water level brims and overflows .

Use, Feb. 2017 One area of the building was used in a minor way in Feb. 2017

Figure H1
Hostel, east elevation, with plywood shutters installed. The aluminium has a slight green tinge and was the original building installed on white pine piles. The recent lounge addition, installed on treated pine piles, with zinc cladding, is a blue grey on the left.

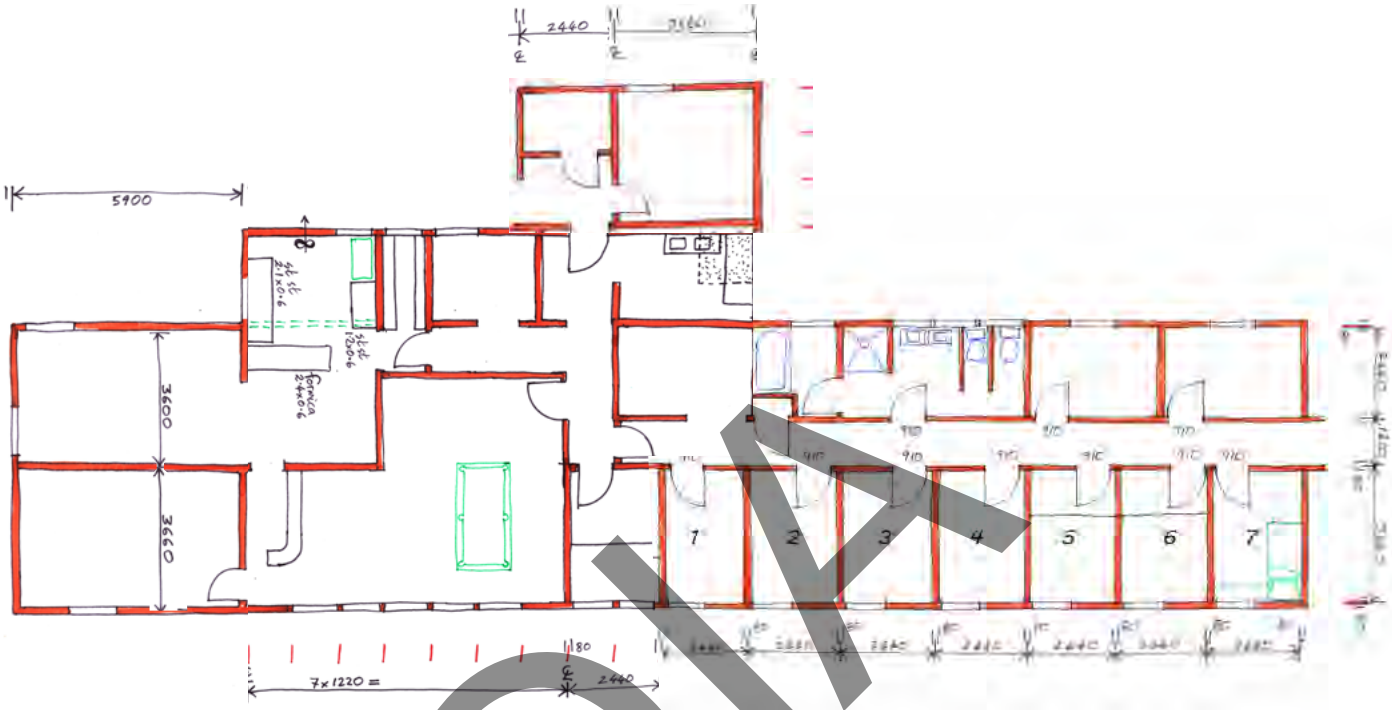

Figure H2
ABOVE The Hostel is set out on a 4 foot (1220mm) grid, and was constructed from transportable flat pack 1220mm wide panels made by the Bristol Aircraft Factory. Each panel has different functions. Some functions of panels include:- Exterior window ; Exterior wall ; Interior wall with roof props ; Interior wall with no roof props ; and an Interior door are common panel types.

On the above plan the bedroom cells are numbered 1 to 7, with bedroom 7 ("PJ") still having the original built in furniture intact. This is of rare significance. Existing furniture is drawn in light green. Any floor platforms in the bedroom, that bring the occupants sight lines above the window sill level, are drawn with a horizontal line across the bedroom or office cell. The line is in the position of the platform.
The recent zinc cladding is on the addition to the left, which is dimensioned 5900mm wide and two rooms deep, each with a dimension of 3600 and 3660mm.

Figure H3
ABOVE The recent zinc clad addition at the south end of the Hostel. The copper treated shutter installed over the window shown in this photo is corroding the zinc.

Figure H4
ABOVE The west elevation of the Hostel, the north end.

Figure H5
LEFT The west elevation of the Hostel looking south to the water tanks and store

Figure H6 & H7
ABOVE The west elevation of the Hostel, the west wall of the store.

Figure H8
RIGHT The west elevation of the Hostel looking north to the entrance to the store, the sign on the wall says "BEEMAN COVE HOSTEL"

Figure H9 & H10
BELOW The west elevation of the Hostel looking east to the entrance to the store, the sign on the wall says "BEEMAN COVE HOSTEL"

Figure H11 & H12
LEFT Recently installed roof patches, using materials with a poor durability.

Figure H13 & H14
LEFT The roof above the kitchen and laundry has a negative slope, and relies on wind and evaporation to clear water . From the original plans, the elevation drawings could indicate that the roof was originally clad with a membrane, as the barge boards are horizontal. This membrane roof cladding is not noted. The recent zinc roof cladding will suffice in the short term but does not meet any building standard or manufacturer's recommendations.

Figure H15
LEFT The zinc on the extension has started to corrode, white rust, or oxidisation, is prevalent at the base of the recent zinc clad Hostel extension.

Figure H16
LEFT Loose number 8 wire connections, between the floor bearers and piles, were shown to provide little resistance to damage in an earthquake.

Figure J1
ABOVE Growth in and extending out of a water tank.

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Condition	Minor repairs only required.
Foundation condition	Not requested and not checked
Roof - Tank condition	Excellent, copper tanks are very durable.
Use, Feb. 2017	To be confirmed, assume use during Feb. 2017.

Figure J2 & J3
ABOVE Extent of water tanks.

Figure J4
RIGHT Detail of water pipes

CONDITION 2J

water tanks

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campbell island-METEOROLOGICAL STATION

Figure J5 & J6
ABOVE Panorama of water tanks.

water tanks

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campbell island-METEOROLOGICAL STATION

2J CONDITION

Historic significance	Low or no significance.
Construction	Standard NZ wide common construction.

Wall condition
Re-cladding on the walls (one) where the bottom edge does not cover the bottom plate will be required in about five years. Structural decay is highly probable. The rest of the cladding should last around one or two decades .

Foundation condition
Minor repairs of additional fixings required as soon as possible for earth-quake strengthening. Generally the foundations could last up to 30 to 50 years. However the cladding does not protect the floor edges, and there were very high readings taken in the particle board flooring. As such, the flooring inside would most likely be the first item to completely deteriorate

Roof condition
Roof replacement would be required up to two decades away.

Use, Feb. 2017	No use during February 2017.

Figure J1
BELOW The east elevation of the Cool Store.

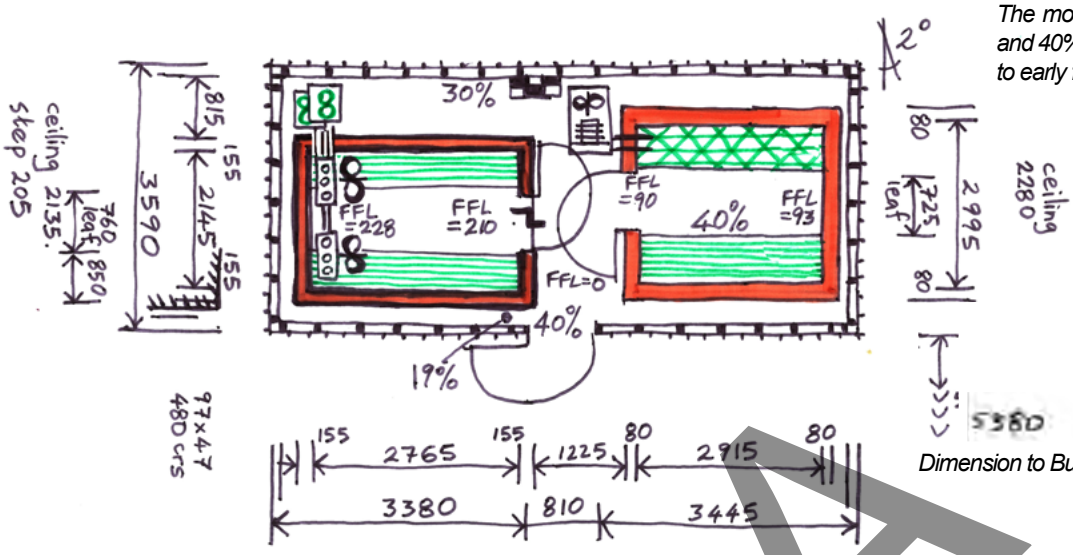


Figure J2
The dimensioned plan of the cool store. The moisture readings are high, at 30% and 40%, and these percentages will lead to early floor failure.

Dimension to Bulk Store (N)

Figure J3
The north elevation of the Cool Store. Compare the condition of the Marsden matting as Michael Kelly, in his historic report, August 2017, took a photo from a similar angle.

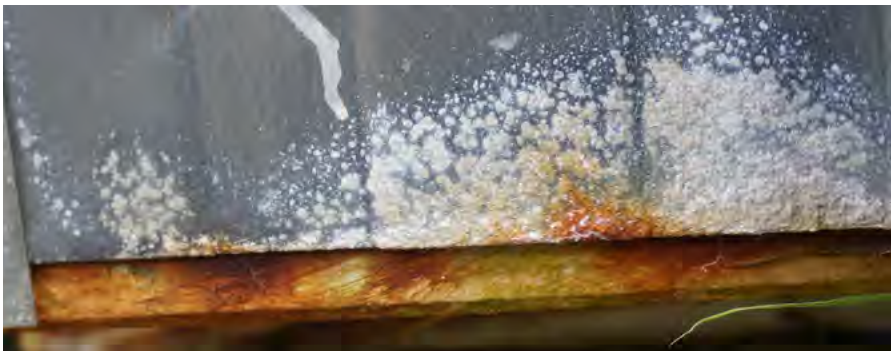


Figure J4
The bottom edge of the cladding of the Cool Store. The bottom plate is visible. Water runs down the cladding, and then over the bottom plate, where the timber will absorb this moisture. This is transferred to the floor where high moisture levels are recorded. This will lead to early floor failure.

cool store

Figure L1
ABOVE The Meat hanging and butchery hanging room. The roof and walls are in very poor condition.

Figure L2 ; L3 ; L4
The east elevation of the Carpentry store on the far right, the vegetable store labelled "DOC" in the centre, and the building equipment and timber stores on the far left.

Historic significance	High historically significant.
Construction	Standard New Zealand wide common construction techniques

Wall condition
Minor repairs required within the next two years, then large repairs needed within a few years.

Foundation condition
Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years

Roof condition
Roof cladding has punctured around the edges and replacement required within one decade at the most.

Use, Feb. 2017	Used during February 2017.

CONDITION 2L

carpentry, vegetable & meat store

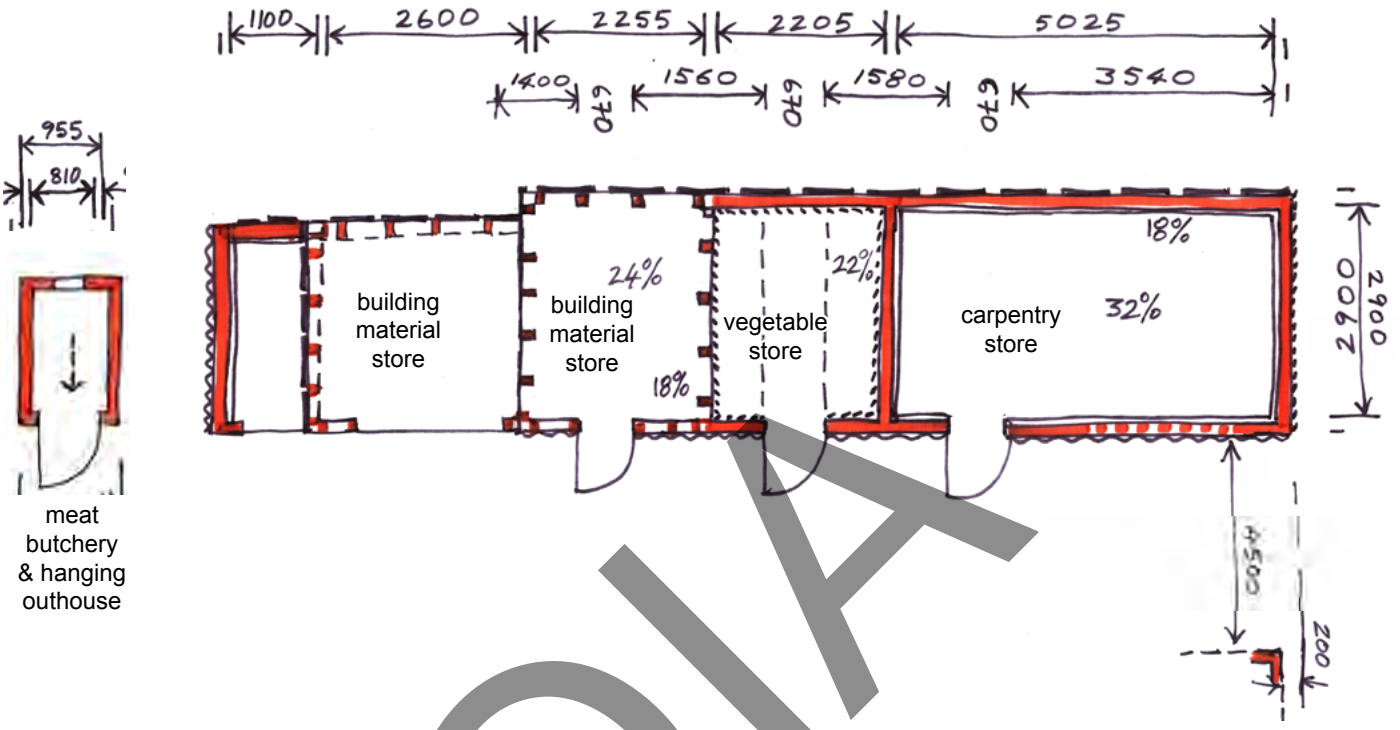


Figure L5
ABOVE The Meat hanging or butchery room is on the far left. The plan indicates the wall materials, with a long dash being a possible asbestos based material, the wavy line is vertical corrugated steel, and the short dots are plywood. A dashed red line indicates a possible window. The percentages indicate moisture content; any figure that is over 20%; will lead to decay. The rate of this decay depends on the durability of the timber

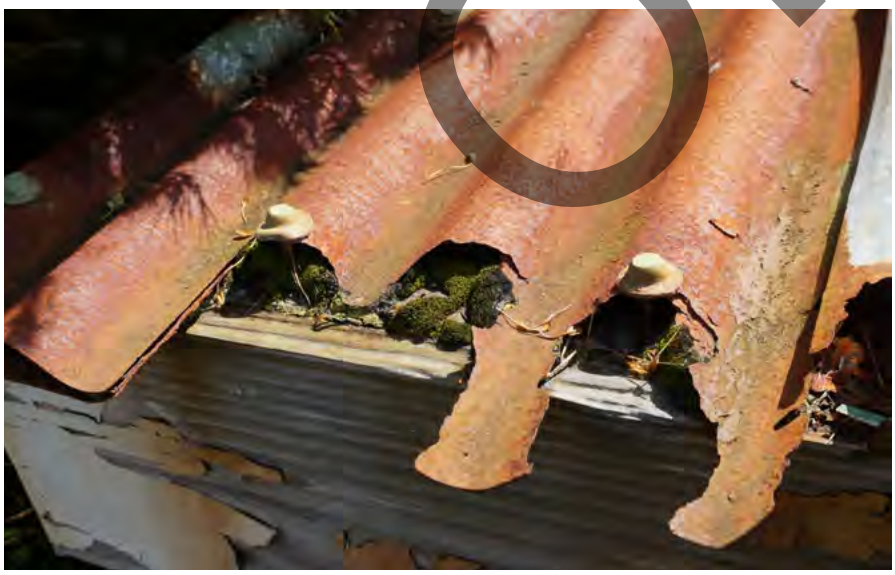


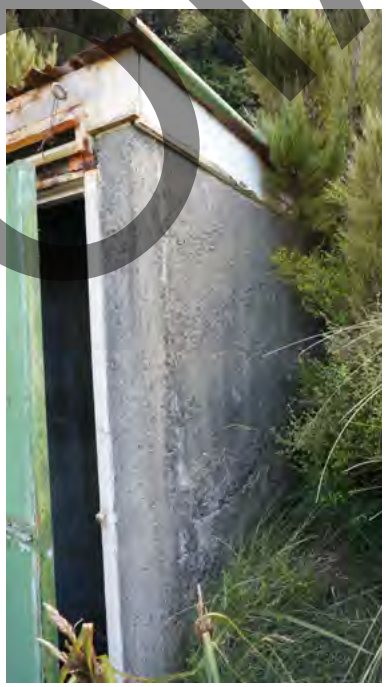
Figure L6
LEFT The condition of the roof on the meat outhouse

carpentry, vegetable & meat store

Figure L7 ; L8 ;
ABOVE. Simple house keeping measures, which involves the removal of moss and forest litter from the roof, would allow the roofing to dry and would remarkably extend the durability of the roofing.

Figure L9 ; L10
NEAR RIGHT. The earth bank has subsided and is now hard against the meat outhouse walls and up over the roof.
FAR RIGHT. Condition of the carpentry walls , with disconnected down pipe. This together with the forest litter on the roof, has lead to high moisture readings.

Figure L11
BELOW Moisture readings in the meat outhouse, showing complete water saturation at 99.9% out of 100%. Readings inside a building should be between 30% & 40% typically.



carpentry, meat & vegetable store

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campbell island-METEOROLOGICAL STATION .

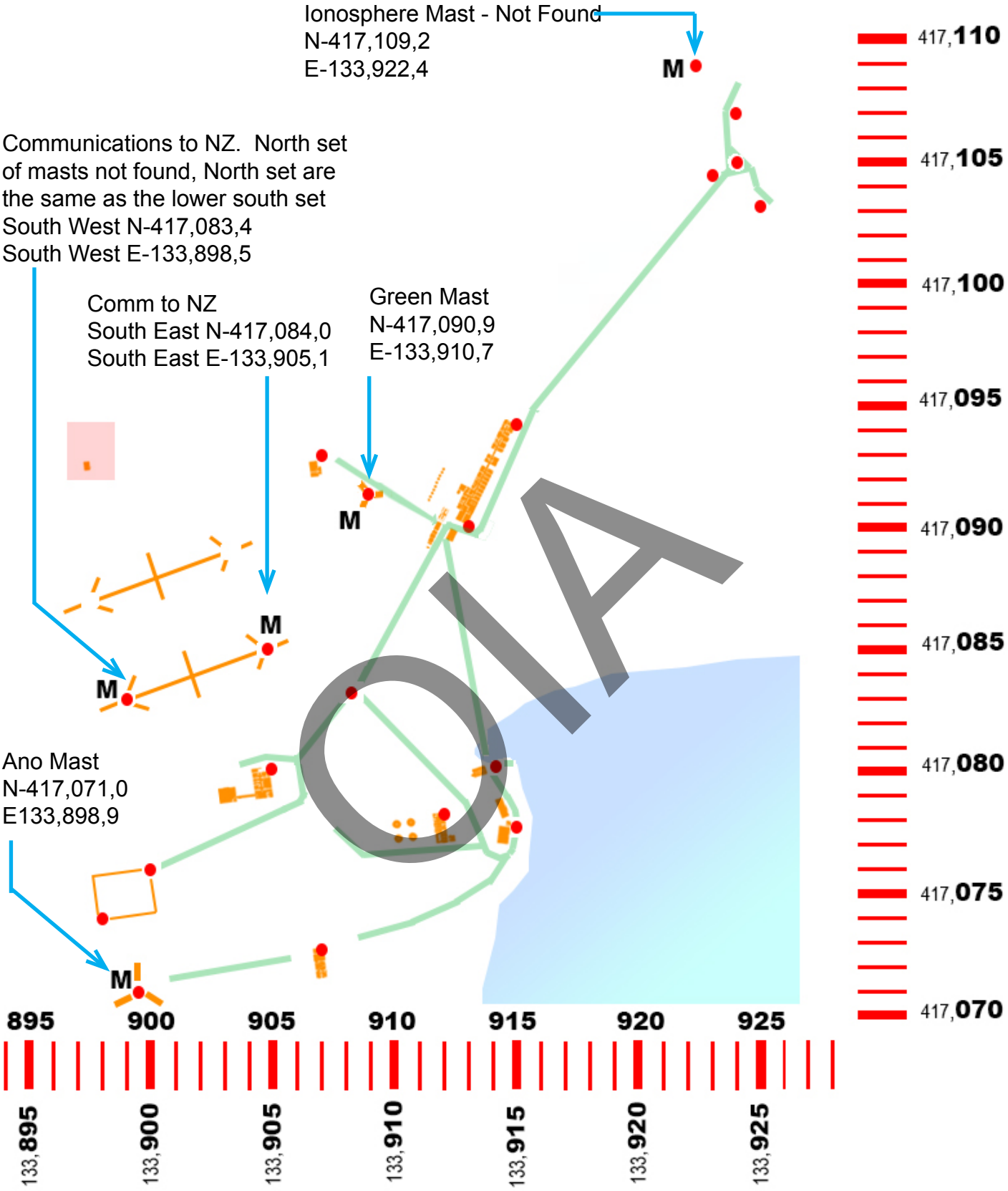
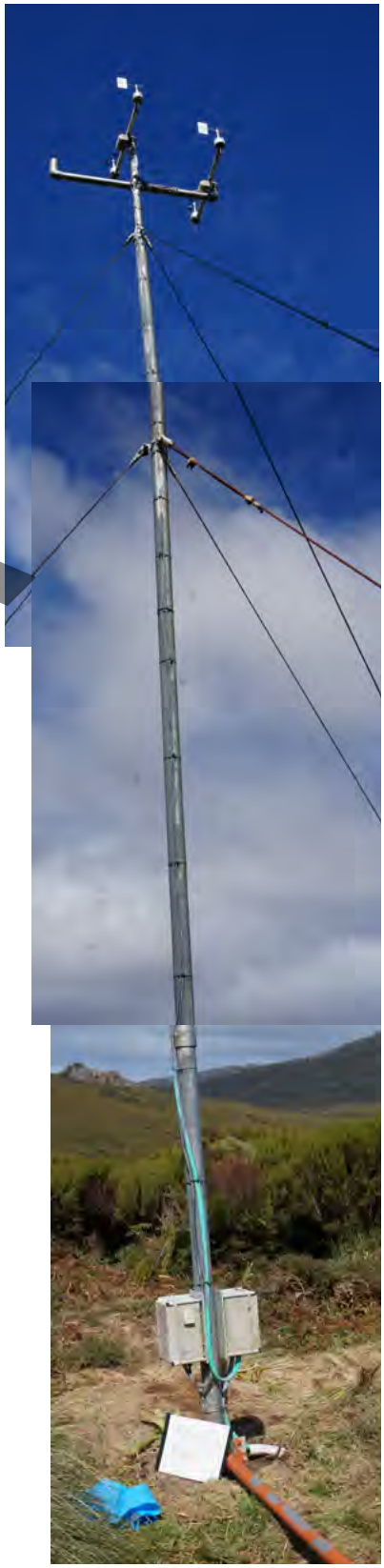


Figure M1
ABOVE. Plan of Masts, with Eastings and Northings, to DoC NZTM , not Campbell Island system, refer page 20

masts

Figure M2
RIGHT. Green Aerial, on the track to the Aurora Hut

Figure M3
FAR RIGHT. Anemometer Aerial, near the climatology enclosure. Automatic equipment transmittal can be seen at the base of the aerial.



masts

Figure M4
RIGHT. Aerial Mast to NZ, this mast was measured and photographed.

Figure M5
BELOW Aerial closest to Technical building (background) was surveyed, as tussock below aerial could be negotiated. Concrete block at base (red arrow) is the South East mast, south west guy block. The remaining platform is the all sky camera.

Guy Block Photo M5

Figure M5
LEFT Second mast not found, as bush was too thick and high. Photo below.

Figure M6
BELOW. Height of bush in area of second mast

masts

Figure M7
CLOSE RIGHT. Aerial Mast to NZ, transmitter feed 150 Parallel Flange Channel (PFC) feed at centre of aerial.

Figure M8
FAR TOP RIGHT Aerial tie down block at each mast end.

Figure M9
FAR MIDDLE RIGHT Aerial mast socket, about 50mm diameter.

Figure M10
FAR BOTTOM RIGHT Guy rod block, at 120 degree intervals.

Figure M11
LEFT. All sky camera building, the walls have been demolished and the foundations only remain. The area for the first aerial to NZ is in the background.

Figure M8
BELOW. The chook shed slab remains. This is below the south east corner of the Technical Building.

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Large repairs needed within a few years. Test completed inside the wall showed cladding was dry and stable.
Foundation condition	Foundations could last up to 30 to 50 years. Foundation bracing missing. Decks around the building are dangerous. Minor repairs of additional fixings required as soon as possible for earthquake strengthening.
Roof condition	Roof cladding punctured in a few places & repairs required within a few years.
Use, Feb. 2017	No use during February 2017, except for the winch

Figure N1
BELOW East elevation, showing cantilevered piles, and little diagonal bracing. The winch to the jetty is on the left. This elevation has the original cladding, however rust stains and perforations exist at the base.

CONDITION 2N

bulk food store

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campbell island-METEOROLOGICAL STATION

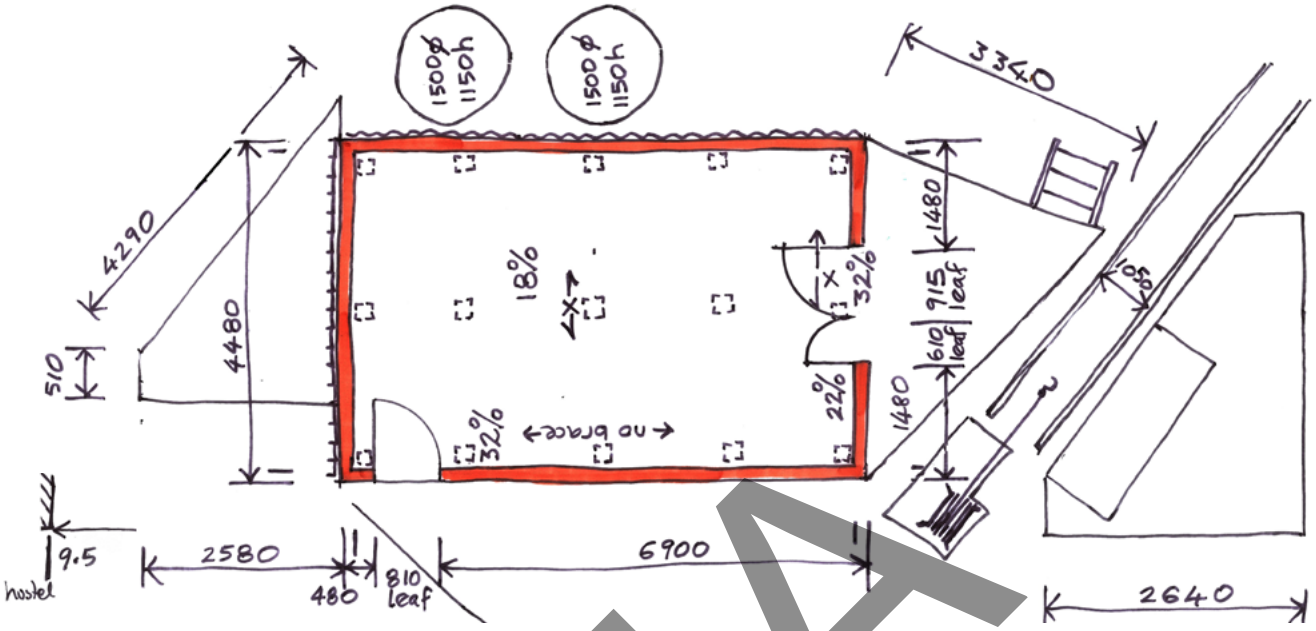

Figure N2
ABOVE Plan, with winch to the jetty on the left.

Figure N3
BELOW Elevation to the west, from the main walkway. The cladding to this elevation has been replaced,

bulk food store

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campbell island-METEOROLOGICAL STATION

2N CONDITION

Figure N4
LEFT North elevation, with original cladding.

Figure N5
LEFT Elevation to the south. The cladding to this elevation has been replaced.

Figure N6
BOTTOM LEFT Roof condition showing perforation.

Figure N7
BOTTOM MIDDLE Patches around the ridge of the Bulk store.

Figure N8
BOTTOM RIGHT Rust starting in areas of the original cladding not replaced.

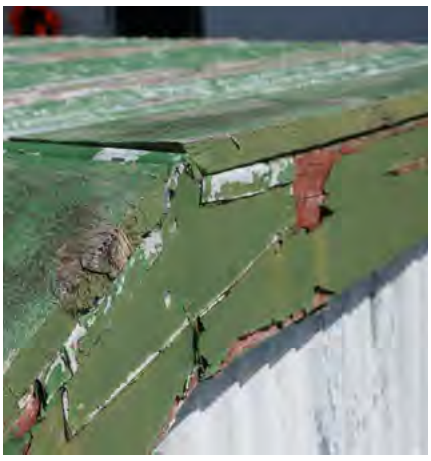

Figure o1
LEFT Photo of the trolley track from below.

trolley track

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campbell island-METEOROLOGICAL STATION

Figure o2
ABOVE LEFT First spare trolley in the bulk store.

Figure o3
ABOVE MIDDLE Second spare trolley in the bulk store. The trolley used in February 2017 was not photographed.

Figure o4
ABOVE RIGHT Trolley track cross over at the boat ramp. The track to the left heads up to the winch, over the sea as per figure o1.

Figure o5
LEFT Photo of the trolley track winch engine and winch, being run by Rossco, Met service.

trolley track

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campbell island-METEOROLOGICAL STATION

Historic significance Construction	Marsden Matting, high significance. Techniques historically significant and unique.
Foundation condition	Slowly rusting away
Use, Feb. 2017	Used as a path stabiliser, Feb. 2017.

Figure N4
ABOVE Typical path condition

Figure N5
LEFT Detail of Marsden matting, one of the few areas where the matting is exposed. There has been a complete change in undergrowth around the matting, refer Michael Kelly's report.

path junction

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques.
Wall condition	Near to demolished by neglect.
Foundation condition	Minor repairs & additional fixings required.
Roof condition	A large portion of the timber roof structure has been neglected and is due for replacement.
Use, Feb. 2017	Space or structure used Feb. 2017

Figure Q1
BELOW Entrance to the jetty boat shed. This structure is close to the boat landing ramp and as such is useful in boat transfers.

CONDITION 2Q

jetty boat shed

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campbell island-METEOROLOGICAL STATION

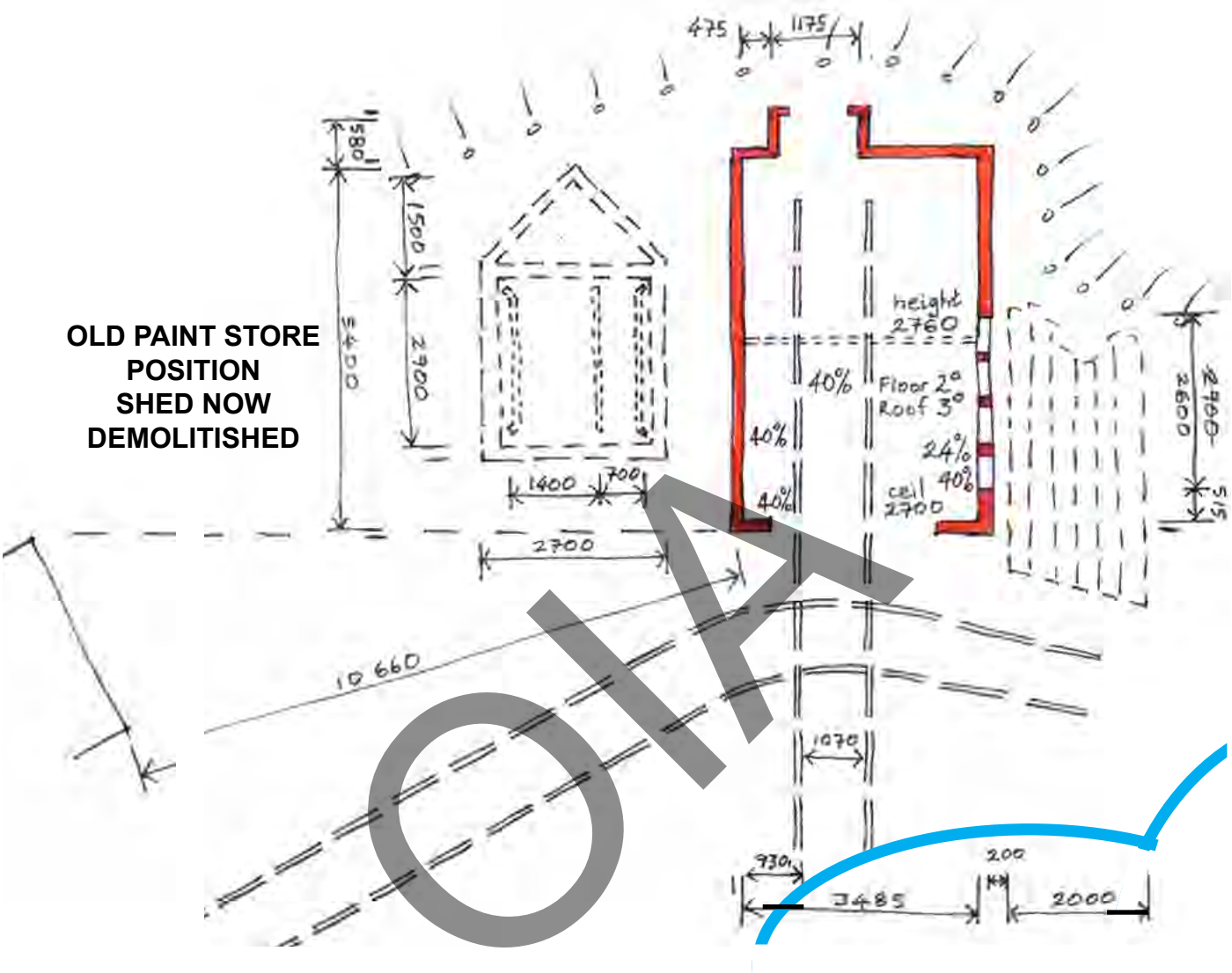

Figure Q2
ABOVE Plan of Jetty Boat Shed, with the approximate mean high water springs shown in blue. Any timber readings of 40% indicate complete water saturation of the timber, and decay is inevitable, depending on the durability of the timber purlins.

Figure Q3
LEFT Detail of roof. Dark stains on the roof members indicate water damage. The roof cladding has been replaced, however the window in the right corner has no glass.

jetty boat shed

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2Q CONDITION

Figure Q4
RIGHT TOP North Elevation, with DoC ranger operations Kathryn Pemberton holding the measuring staff. The far left pane of glass is missing, and the bank to the right has slipped and is resting against the right (west) wall. The wall still has the original corrugated cladding.

Figure Q5
RIGHT MIDDLE South wall, showing original cladding, and more recently replaced roof. The west wall (left) where the bank has slipped now has vegetation growing from the slipped soil, and over the roof. Encouraging roof structural decay.

Figure Q6
RIGHT LOWER MIDDLE South wall, with Diesel hose, for filling the land based tanks from tanker ships. The railway and winch is to the right, with a small corner of the Hostel visible to the far right.

Figure Q6
RIGHT BOTTOM Inside, with the earth against the west wall, visible through the far door, where I assume the door has decayed.

CONDITION 2Q

jetty boat shed

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campbell island-METEOROLOGICAL STATION

Historic significance	High historic significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required. The galva nised sheet has been installed directly over all the windows and doors, and this will lead to excessive sweating of the wall, doors, and windows. Then decay.
Foundation condition	Minor maintenance checks to ensure that the ground is kept 200mm below the low-est weather board. Replace the lowest flashing at the base of the weatherboards.
Roof condition	Roof cladding rusting and needs replace-ment in less than one decade.
Use, Feb. 2017	Used during February 2017.

Figure R1
BELOW East Elevation, the Spirits Store, where spirits refers to motor spirits, pet-rol, diesel, paint thinners, and paint. The inside is completely clad in galvanised steel sheet, taken across all the windows. There is no ventilation between the galv sheet and the wall

formerly Mechanical Shed

spirit / paint store

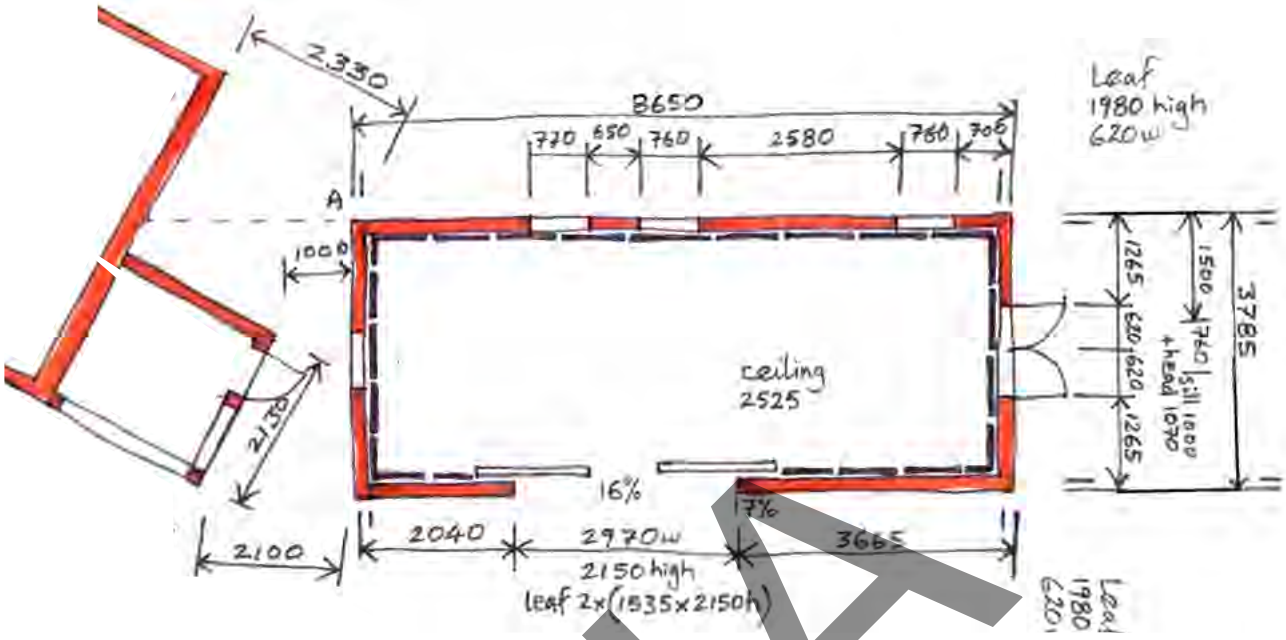

Figure R2
TOP Floor Plan

Figure R3
RIGHT MIDDLE North wall, with decaying peat partially removed from the base.

Figure R4
RIGHT LOWER South wall, with interior cladding clad directly behind the windows.

formerly Mechanical Shed

spirit / paint store

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campbell island-METEOROLOGICAL STATION

Figure R5
LEFT TOP Wall closest to the bank, moss and mould will speed up decay and needs to be removed.

Figure R6
LEFT MIDDLE Concrete foundations, with evidence of creepers entering the wall through the bottom plate.

Figure R7
LEFT LOWER MIDDLE The corner of the doors, where the door style meets the bottom rail. This, as well as other style / bottom rails, are rotten.

Figure R8
LEFT LOWEST Roof where edge has lost the protective coating, and the sub-strate is rusting .

formerly Mechanical Shed

spirit / paint store

Historic significance	High historic significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required. A galvanised flashing at the base of the wall has rusted away and needs replacing before water decays the structure behind. The rest of the wall is in good condition.
Foundation condition	Minor maintenance checks to ensure that the ground is kept 200mm below the lowest weather board.
Roof condition	Roof cladding rusting and needs replacement in less than one decade.
Use, Feb. 2017	Used during February 2017, mainly for rubbish storage.

Figure S1
BELOW East elevation of Jetty Store with winch alcove, with window openings removed and on the ground leaning against the Spirits / Paint store.

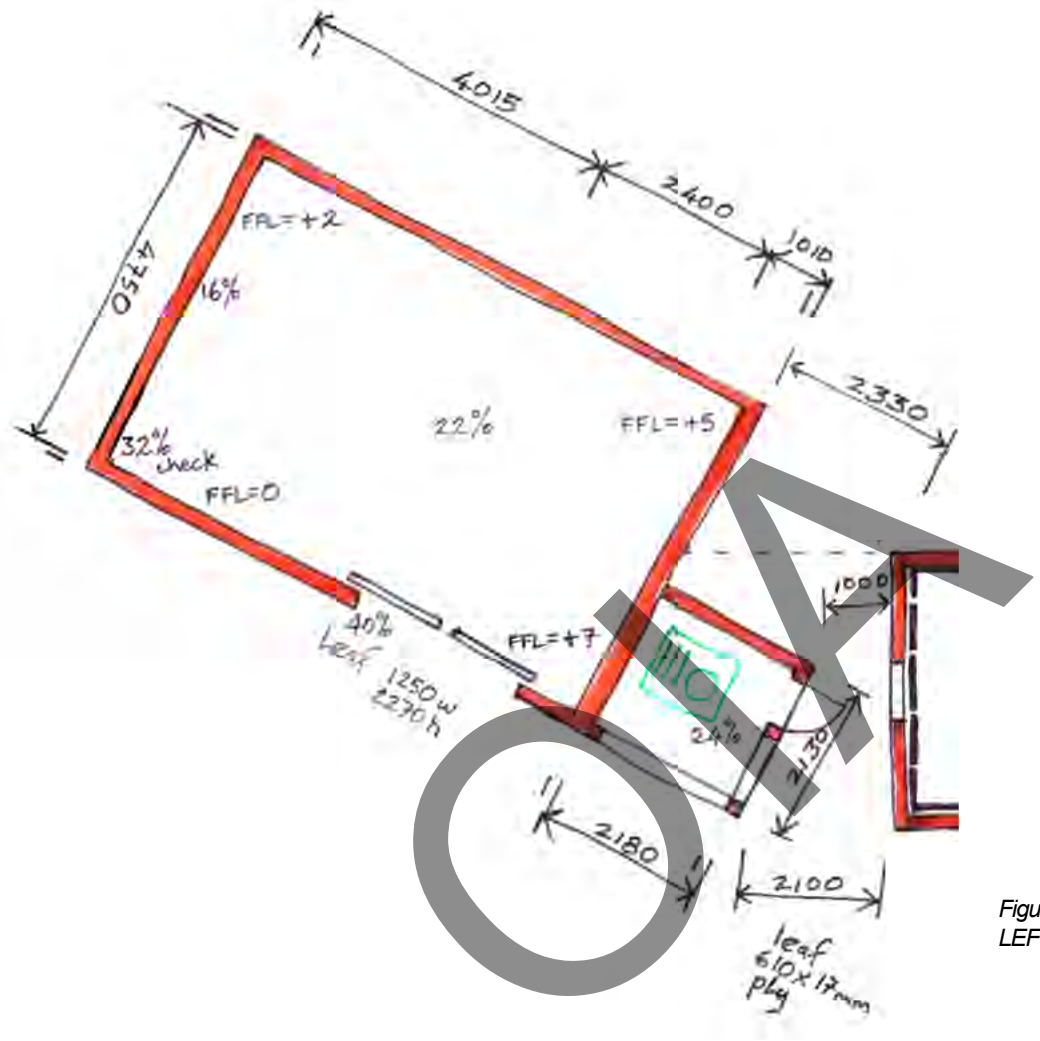


Figure S2
LEFT TOP Jetty Store, Floor Plan

Figure S3
LEFT BOTTOM Winch in winch alcove.

jetty store

Figure S4
LEFT TOP South wall of the Jetty Store,

Figure S5
RIGHT TOP North wall of winch alcove.

Figure S6
LEFT MIDDLE North wall, behind the winch alcove.

Figure S7
RIGHT MIDDLE West wall, next to the bank.

Figure S8
RIGHT MIDDLE Accumulated rubbish in store room.

Figure S9
RIGHT BOTTOM Rusting strap on door. The door styles / bottom rails are also rotten

Historic significance	High historic significance.
Construction	Techniques historically significant and unique.
Wall condition	Minor repairs only required where copper treated glazing panels were added over the glass / windows. If these panels had not been added, then there would be less maintenance and the aluminium panels on the facade would last many years longer. Some wall panels have high internal moisture readings and decay is expected.
Foundation condition	Foundations could last up to 30 to 50 years. Minor repairs of additional fixings required as soon as possible for earthquake strengthening.
Roof condition	Minor repairs required, roof replacement within one decade as black membrane protecting the laps of the panel roof system is debatable
Use, Feb. 2017	High use all year around in one corner of the main room, where permanent weather forecasting equipment has been set up. Rest of the spaces had little or no use during February 2017.

Figure T1
BELOW East elevation of the technical building, with solar panels on the roof that supply power to the permanent climatic equipment in the corner of the room.

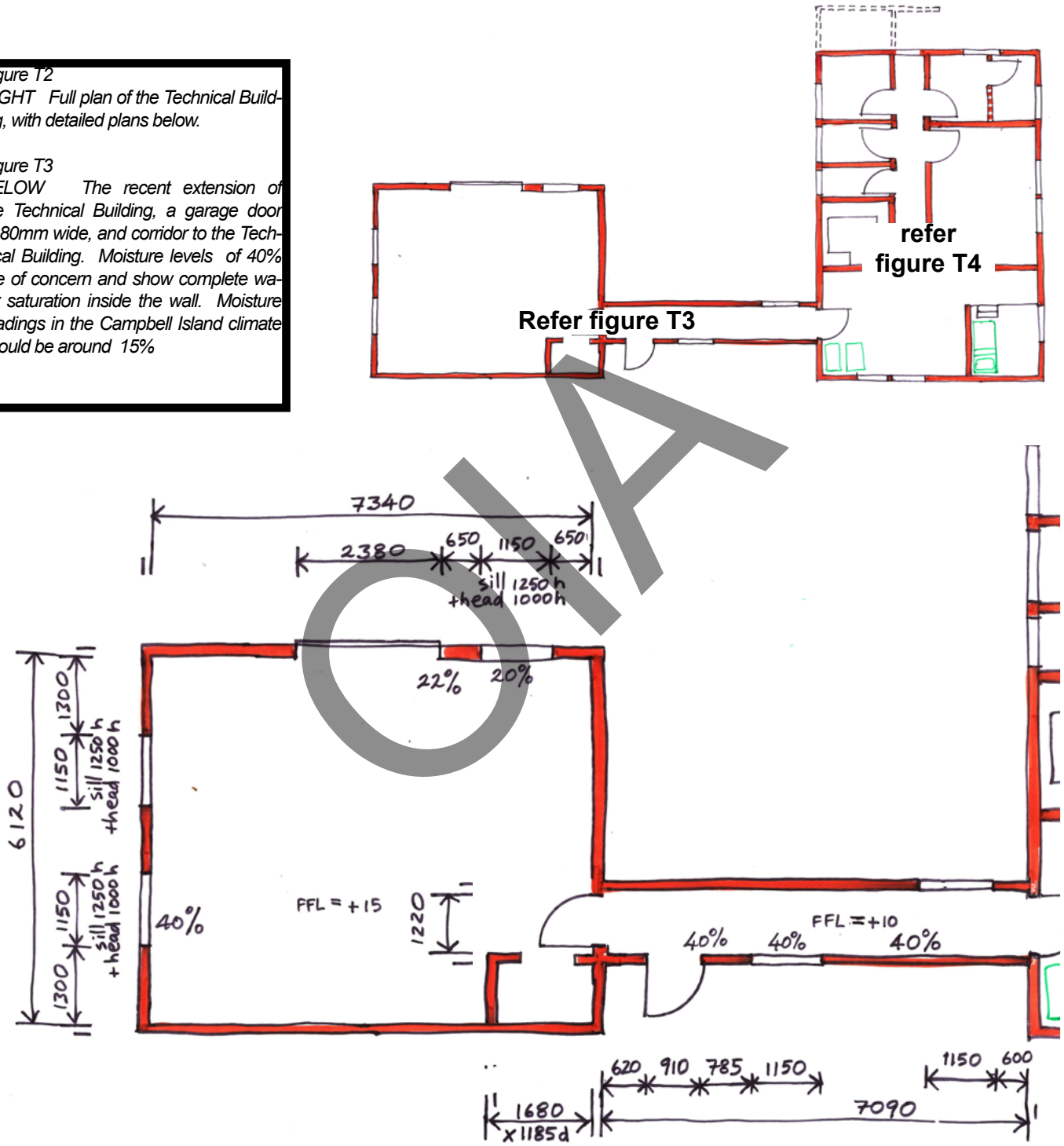
technical building

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

Figure T2
RIGHT Full plan of the Technical Building, with detailed plans below.

Figure T3
BELOW The recent extension of the Technical Building, a garage door 2380mm wide, and corridor to the Technical Building. Moisture levels of 40% are of concern and show complete water saturation inside the wall. Moisture readings in the Campbell Island climate should be around 15%



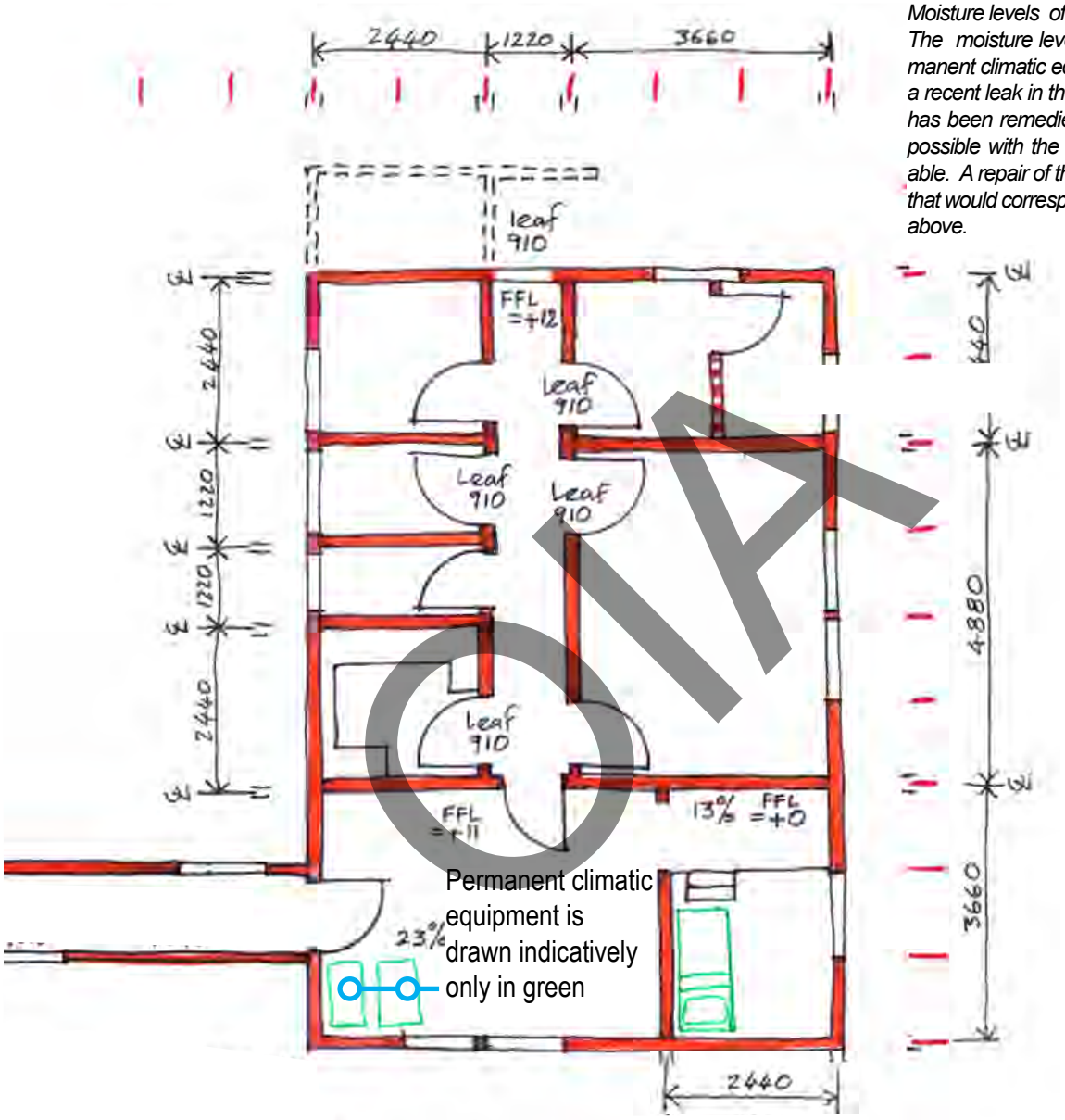


Figure T4
BELOW The original Technical Building. Moisture levels of 13% are excellent . The moisture level of 23% near the permanent climatic equipment is indicative of a recent leak in the roof above. This leak has been remedied to the best standard possible with the ad hoc materials available. A repair of this sort has a limited life, that would correspond to the life of the roof above.

Figure T5
LEFT The permanent climatic equipment is circled in red, generally on the old desks. The moisture reading, 23%, was completed in front of the battery pack, under an existing roof leak partially fixed. This reading indicates inevitable decay, with the rate of decay dependent on the durability of the timber. The flooring would have the least durability.

Figure T6 , T7 , T8
ABOVE The south elevation of the Technical Building.
The foundation timber sample was taken where the yellow circle is on fig T7. This was taken to prove equivalence to other timber samples taken on other historic buildings, to estimate durability of Silver Pine. A note in the 1950's in the George Poppleton's book on "Campbell Island 1955-56 - 1958 - 60" was that this timber in the 1950's was a 'supply problem'

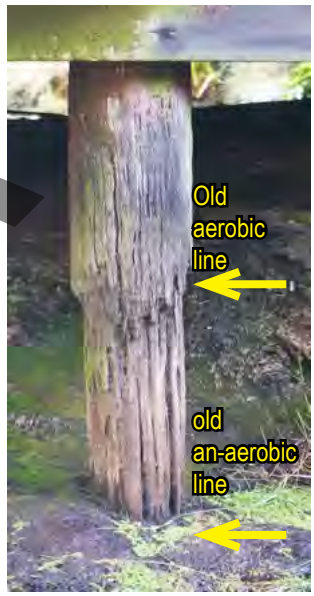


Figure T9
FAR RIGHT The Silver Pine pile. The same species was used on the Ormondville Railway Station. At Ormondville this species of timber pile lasted approximately 90 years in a soft peat . As is typical, decay at Ormondville was most aggressive on the aerobic / anaerobic zone, between dry and wet peat. This is seen on this pile where the ground level has eroded away over time.

Figure T10
ABOVE RIGHT Microscopic view of the timber species. Both Ormondville and Campbell Island piles have similar cell structure. Also the specific gravity of both timbers was measured by coating samples in water and measuring in a test tube. Both are above a specific gravity of 1, an unusual non typical reading.

Figure T11
RIGHT The north elevation of the Technical Building, with the garage door (2380mm wide) in green.
The photo to the left was not taken owing to a particularly aggressive seal (Sammy) taking up residence in the scrub to the left of where I was standing when taking this photo.

CONDITION 2T

technical building

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campbell island-METEOROLOGICAL STATION .

Figure T12
ABOVE The original aluminium clad roof, with a membrane over, an economical possible solution to remedy the roof leaks. This membrane is now ending its effective life.

Figure T13
ABOVE RIGHT Solar panels powering the climatic equipment. Roof membrane degradation shown with silver patches showing through the black membrane.

Figure T14
ABOVE RIGHT The original aluminium roof panels viewed a missing ceiling panel.

Figure T13
ABOVE LEFT Recent water damage from above the bed, in an area of a previously leaking roof. This leak is from the same flashing as was fixed above the permanent climatic equipment.

Figure U1
ABOVE The Jetty, just before being roped off .

Figure U2
RIGHT The Jetty derrick

Figure U3
LEFT Extent of timbers removed from the jetty

Figure U4
BELOW Detail of the Jetty derrick

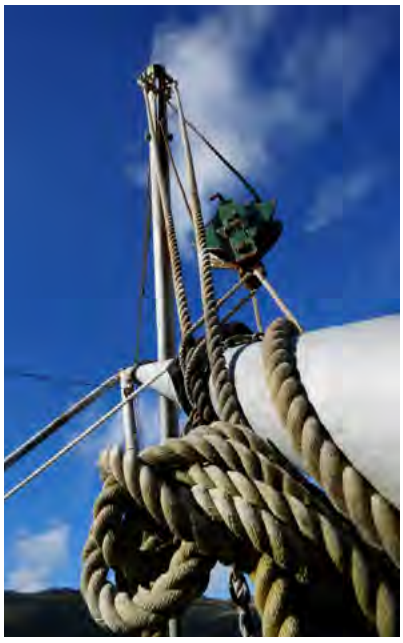
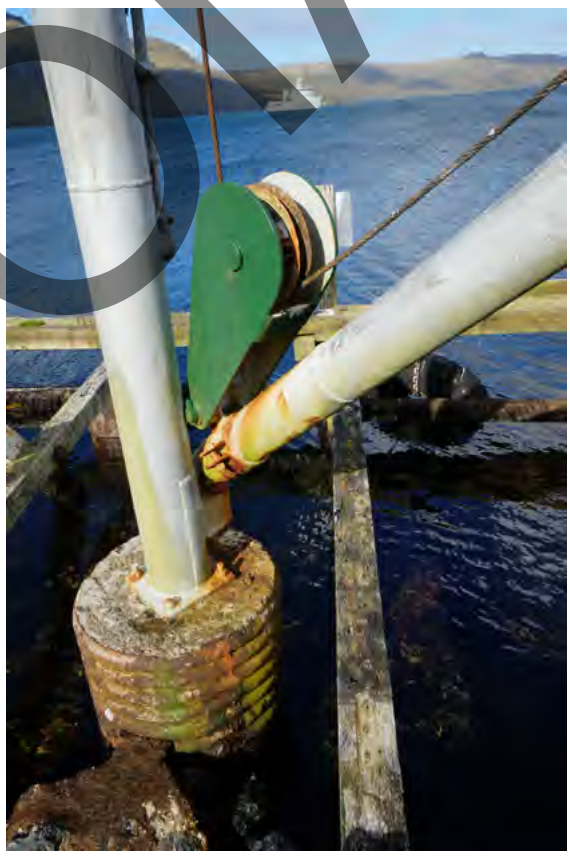


Figure U5 , U6
ABOVE Extent of timbers removed from the jetty from the winch room, (S)

Figure U4
RIGHT The HMNZS Otago viewed through the derrick



Historic significance	Highest category, historically significant.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Near to demolished by neglect, structural timbers are mostly sound, where test drilling was possible .
Foundation condition	Near to demolished by neglect, sunk 300mm.
Roof condition	Near to demolished by neglect
Use, Feb. 2017	Use impossible, close to demolished.

Figure V1 , V2 , V3 , V4
CLOCKWISE FROM TOP LEFT The east, north, south, and west elevations of the Tucker Hut

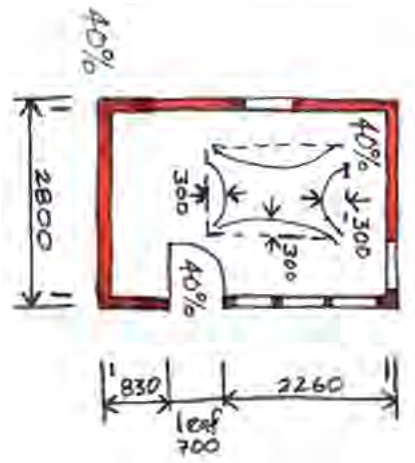


Figure V5
RIGHT The plan of the Tucker Hut. the 300 mm dimension is the amount that the floor is out of level. The 40% figure indicates complete saturation of all timbers.

Figure V6
FAR RIGHT The author, Paul Cummack, completing sample test drills of the structural timber studs. The timber here was sound.

Figure V7
BELOW The ceiling has collapsed onto the furniture below. Holes in the roof are visible as light patches. The window is missing. The towel in the far left bottom corner has remained relatively clean with all the internal moisture.

Figure V8
LEFT Condition of the edge of the roofing, showing extensive perforation.

Figure V6
LEFT Record of the size and profile of the weatherboards.

Historic significance	Low significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required.
Foundation condition	Foundations could last up to 30 to 50 years
Roof condition	Minor repairs required, however roof replacement is due within one decade, as areas rusting.
Use, Feb. 2017	No use during February 2017.

Figure W1
BELOW South elevation of the generator garage.

CONDITION 2W

generator garage

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campbell island-METEOROLOGICAL STATION

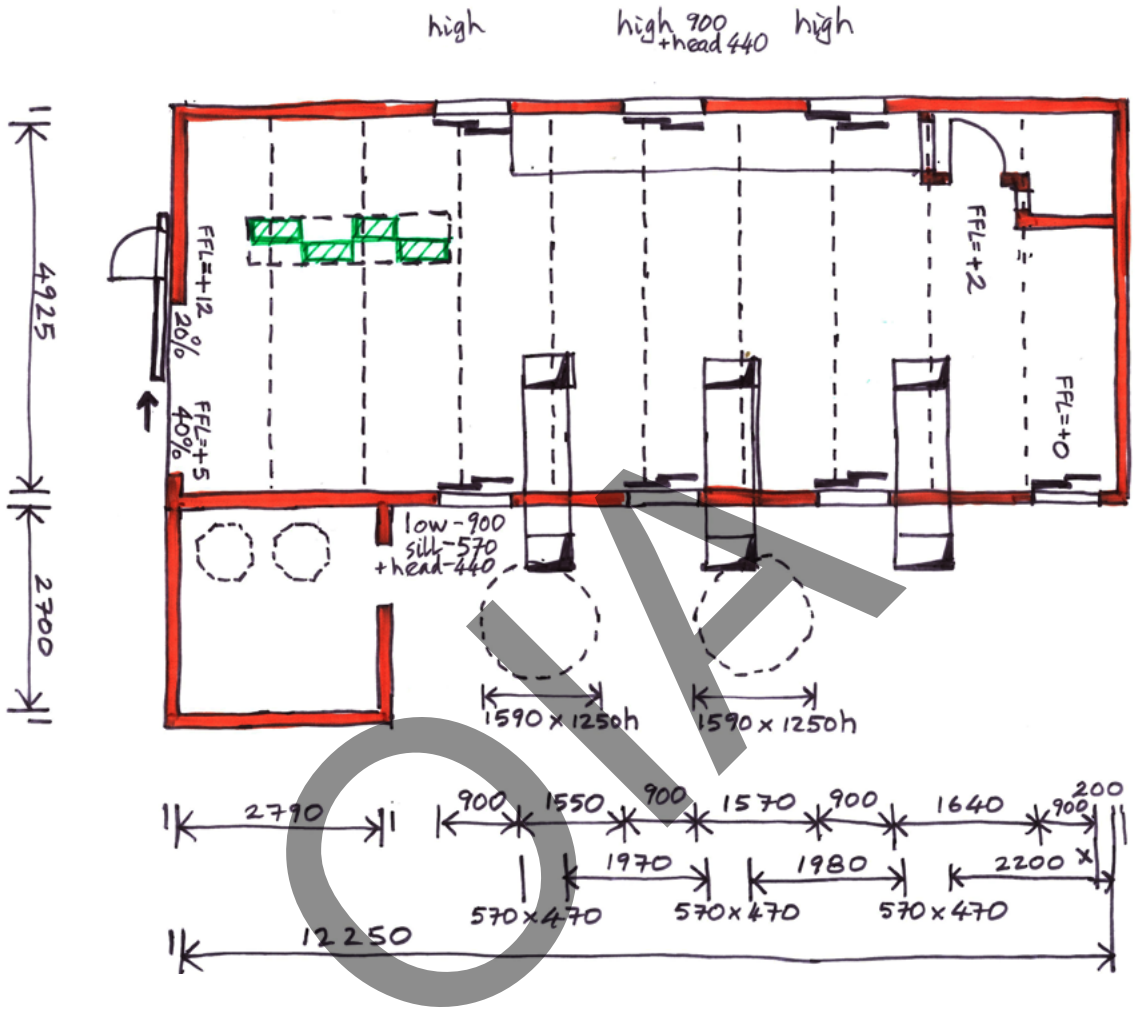

Figure W2
ABOVE Floor plan of generator garage.

Figure W3
LEFT North elevation of the generator garage

generator garage

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campbell island-METEOROLOGICAL STATION

2W CONDITION

Figure W4
FAR TOP Generator garage, east elevation, the water tanks at the front have been given to the HMNZS Otago

Figure W5
ABOVE West elevation.

Figure W6
RIGHT Rust developing at the edge of the roofing.

CONDITION 2W

generator garage

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campbell island-METEOROLOGICAL STATION .

Figure X1
FAR TOP South elevation of the water tanks.

Figure X2
ABOVE West elevation.

fuel tanks

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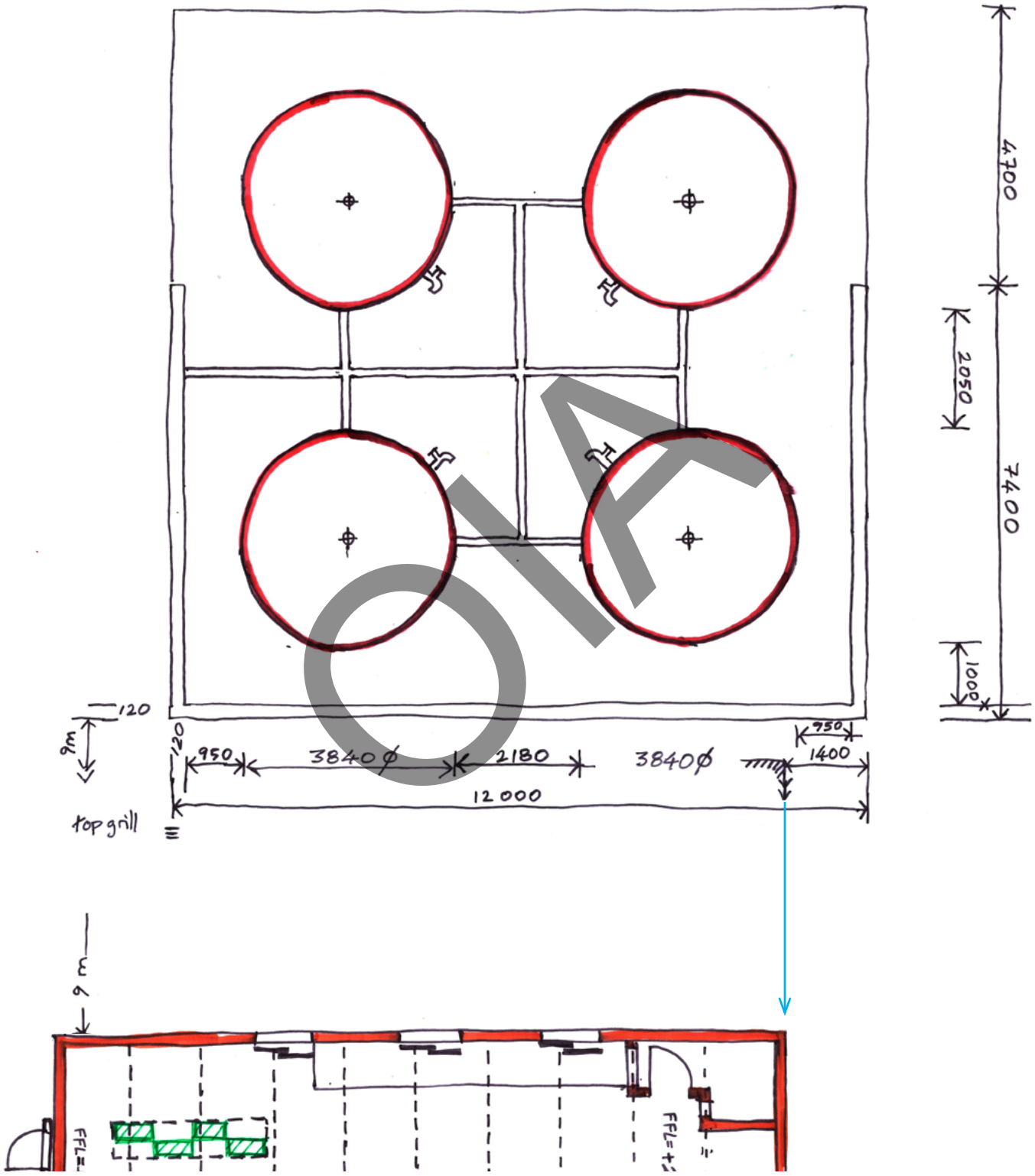
campbell island-METEOROLOGICAL STATION

2X CONDITION



CONDITION
2X

fuel tanks

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION

Historic significance	High historic significance.
Construction techniques	Standard New Zealand wide common construction
Wall condition	Near to demolished by neglect. Large repairs were completed less than a decade ago by over-cladding with plastic sheeting. This sheet is now extensively chipped, brittle, and no longer provides protection.
Foundation condition	Foundations could last up to 30 to 50 years Minor repairs of additional fixings required.
Roof condition	Not possible to view.
Use, Feb. 2017	No use during Feb. 2017, asbestos inside.

Figure Y1
BELOW TOP Photo of sign on the hydrogen building.

Figure Y2
BELOW MIDDLE Photo of sign on the hydrogen building, taken with a red filter, so that the letters can be read.

DANGER
HYDROGEN EXPLOSIVE
NO SMOKING
NAKED LIGHTS
PROHIBITED

Figure Y3
BELOW Photo of the east elevation on the hydrogen building.

Figure Y4
RIGHT Photo of the "Asbestos" sign, prohibiting entry during our visit.

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2Y CONDITION

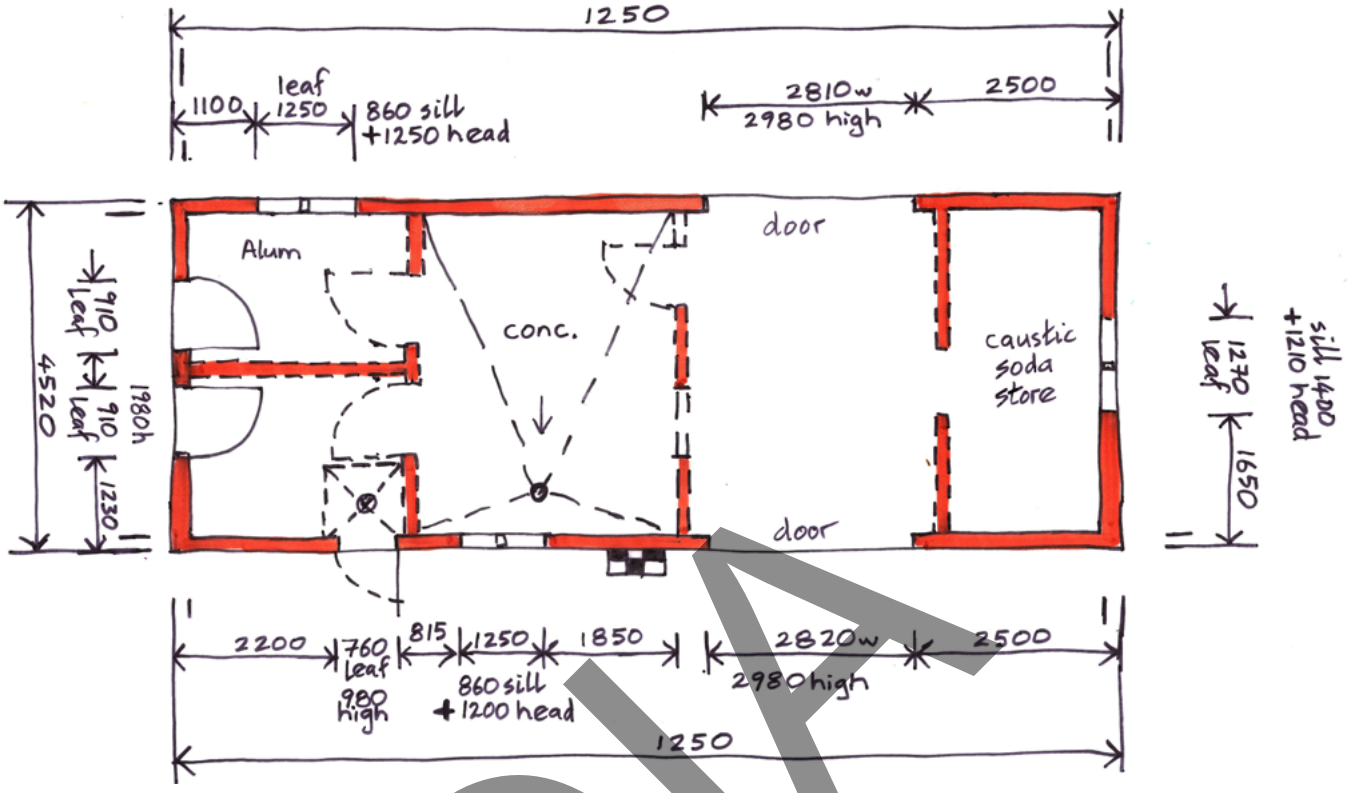


Figure Y5
ABOVE Plan of hydrogen building, dotted outlines are estimated.

Figure Y6
RIGHT South elevation

CONDITION 2Y

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION

Figure Y7
ABOVE West elevation of the hydrogen building.

Figure Y8
LEFT North elevation, like Aurora House, the plastic overcladding that was to keep the building waterproof, (instead of painting), has become brittle and in-effective, and has been broken by sea lions.

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2Y CONDITION

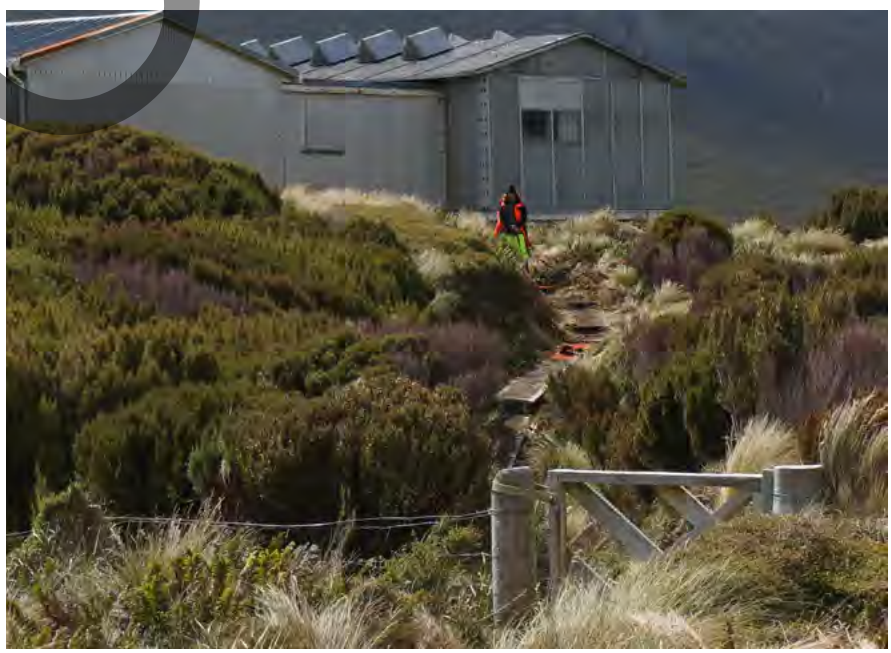


Figure Z1
ABOVE Climatic Enclosure, from east edge, looking west.

Figure Z2
MIDDLE Centre of Climatic enclosure.

Figure Z3
BELOW Inside the climatic enclosure, from the east edge, looking east towards the Technical Building.

CONDITION 2Z

climatic enclosure

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION .

HIGH RESOLUTION PHOTOS

The disc attached below has high resolution photos for:-
GENERAL - all photos used in section 1.
CONDITION - all photos for section 2, with the prefix letter corresponding to the section 2 suffix letter used in this report.
INTERIOR - additional photos of the interior of each building, to assist with any planned works. The prefix letter on the photo corresponds to the letters listed in the table to the left.

A Aurora House
E DoC Hostel
F DoC Hostel Extension
G Hostel – Annex
H Hostel
K New Cool Store
L Carpenters Shop & Vege store
M Masts and foundations
M Sky Camera foundations
M Chook Shed foundations
N Bulk Food Store
O Trolley Track
P Marsden matting
Q Boat Shed – Jetty ramp
R Paint & Spirit Shed
S Jetty Store
T Technical Building
U Jetty & Crane
V Tucker Hut
W Generator House
X Bulk Oil Storage

CAMPBELL ISLAND meteorological station

BUILDINGS, CONDITION & PLANS

MEASURED FEBRUARY 2017

FOR

DEPARTMENT OF CONSERVATION SOUTHLAND

BY

PAUL CUMMACK CONSERVATION

REVISION 1 OCTOBER 2017

Figure 0-1
COVER, Sea Lion, Met station in the background, Photo from "Subantarctic Campbell Island " by Alfred M. Bailey and J.H. Sorensen.

Figure 0-2 & 0-3
ABOVE & LEFT, Navy staff, HMNZS Otago, with DoC staff. (multi- coloured). Author, Paul Cummack, orange jacket, bottom right, with white beard & little hair.

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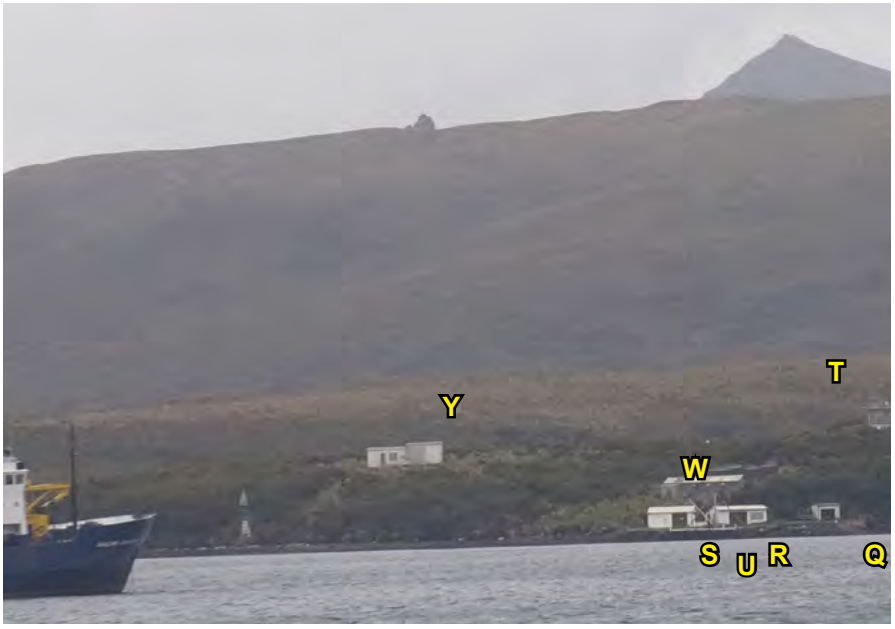
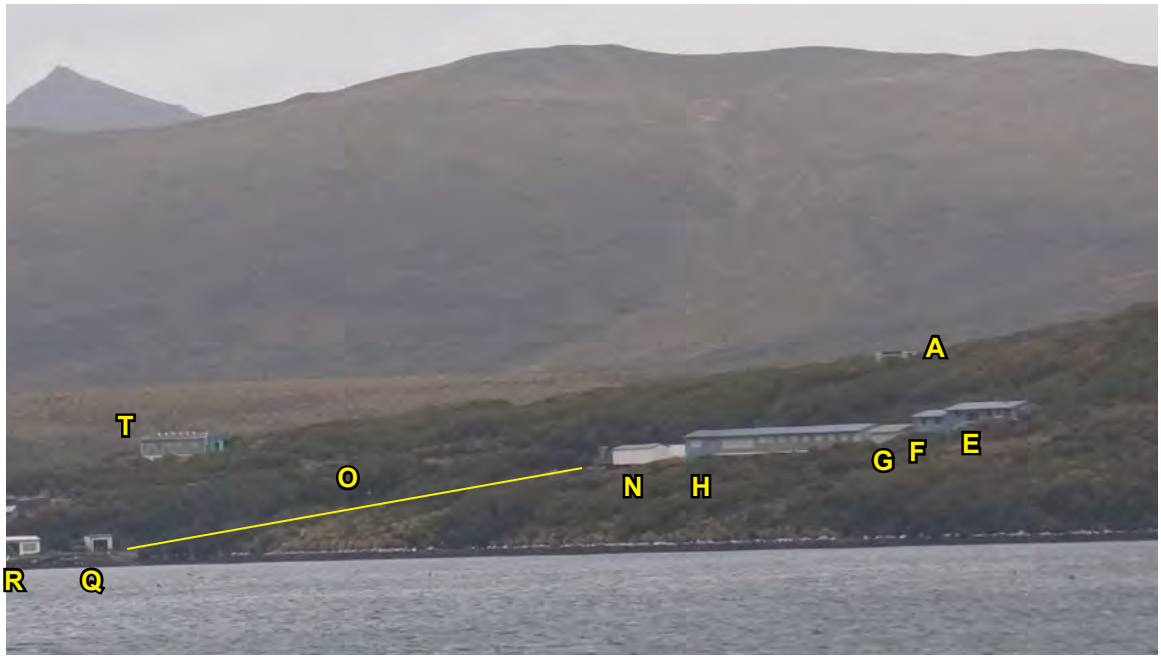


Figure 0-4
LEFT Meteorological station, south.

Figure 0-5
BELOW Meteorological station, north.
The Technical building is shown in both photos.



A Aurora House
E DoC Hostel
F DoC Hostel Extension
G Hostel – Annex
H Hostel
N Bulk Food Store
O Trolley Track
Q Boat Shed – Jetty ramp
R Paint & Spirit Shed
S Jetty Store
T Technical Building
U Jetty & Crane
W Generator House
Y Hydrogen Building

ABOVE, The meteorological station, at Beeman Base, Campbell Island, Februrary 2017, taken from HMNZS Otago.
The key to the letters is to the left

1 EXECUTIVE SUMMARY

1- Over the past decade, less than 40% of the buildings on Campbell Island have been occupied by people or materials at any point. In general, the buildings that have been used are those with less durability and less heritage significance.

2- The wall cladding chosen for the main buildings when the base was established was of such a high standard that no maintenance work has been required on them in the last 60 years, nor is work required in the short term future. Cheaper materials of lower durability have been used with each subsequent decade until now when the most recent repairs require redoing after two years (plywood shutters and flashings). In addition to this, the net result of this recent intervention has made the whole durability of the building worse than if nothing had been repaired or added. (Refer section 1g).

3- Over the last two decades, in general, cheaper materials of low durability have been used to repair many buildings. The lack of a long-term plan of repair and maintenance, together with the fact that the Navy bears transportation costs, means that the true cost of installing such fabric is not considered when work is undertaken. In short, low cost, less durable materials require replacement more quickly than higher quality, more expensive materials. (See section 1L)

4- There is an alarming back log of deferred large expenditure re-cladding maintenance. (Refer figure 1.2 below).

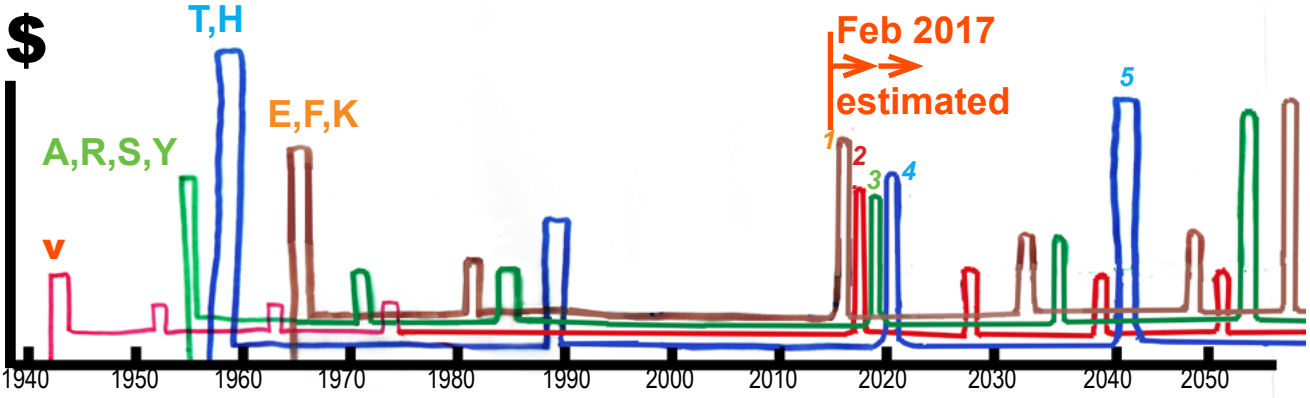
5- To re-clad even 40% of the buildings will require tradespeople to sleepover on the island. D.o.C. to check limitations for water supply and septic tank capacity. The World Heritage application, clause 4.3.4 *Tourism*, permits a maximum of 600 "tourist landings" and does not limit tradespeople. The working day is too short if tradespeople are navy ship based. (See section 1i)

6- Reducing the building stock to 40% of its current level would require even better co-operation between the MetService and DoC.

7- In future, work on buildings should be undertaken by appropriately skilled tradesmen. Well intentioned volunteers, or people who have expertise in a different trade, lack the skills to do the appropriate work effectively enough to ensure that it does not have to be replaced prematurely. (Section 1g & 1r).

Figure 1-1
ABOVE The very historic Tucker Hut, near to demolished by neglect.

Figure 1-2
BELOW A generalised (anecdotal) indication of costs. Tucker hut (V) [red] with initial cost for building, then every 10 years cost for re-painting . Zinc clad buildings (E,F,K) [brown] the initial cost is more, and the gap between maintenance is longer. The Technical building (T) and Hostel (H) [blue] the initial cost is higher again and the gap between maintenance is even longer. Between 1995 and 2017 there is a gap where periodic maintenance has not been completed.
In the future [1] replace perforated zinc cladding, [2] repair Tucker Hut, [3] repair and repaint timber framed buildings, or re-clad, since painting in a damp environment is time consuming, [4] replace Technical building roof and cladding under copper treated window shutters. [5] re-clad rest of aluminium on Hostel and Technical building. The estimated dates further out from Feb. 2017 are VERY approximate.



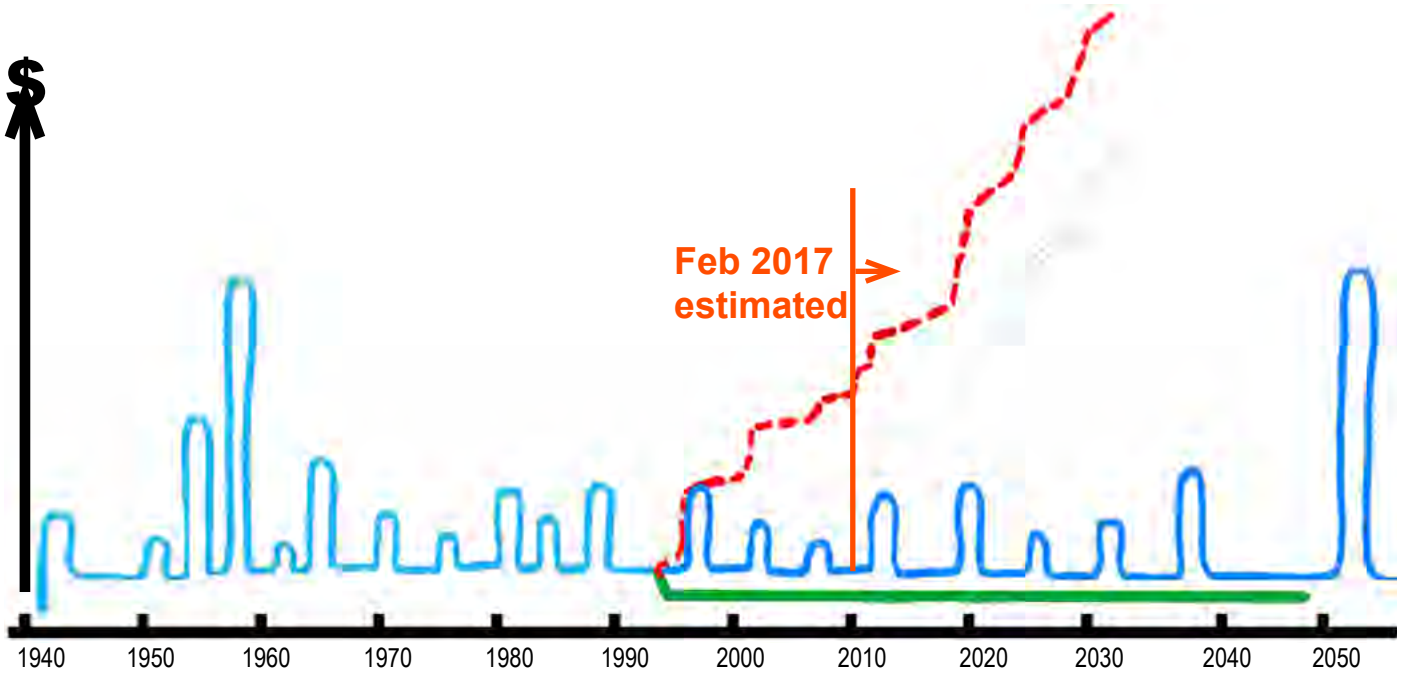


Figure 1-3 ABOVE Accumulated costs, generalised & anecdotal shown with the blue line. Expenditure on larger maintenance items stopped between around 1995 and 2017 and the green line shows the reduction in costs at this time. If maintenance is not completed in a timely manner, then there are secondary maintenance costs that must be added. For instance, a cladding that has already perforated will rot out the structure underneath, hence, the recovery costs of re-establishing a periodic maintenance programme, (the red dotted line) is exponential . The costs start at the vertical red line, then drops down to the blue line after an initial high expenditure.

Figure 1-4
ABOVE An industrial laser was used to check the condition of the foundations, these measurements are on the plans, eg FFL +10.

Figure 1-5
BELOW A sliding hammer was used to check moisture levels INSIDE the wall

Acknowledgments. I would like to thank all the staff from D.o.C. and Met service, photographed in figure 0-2 & 0-3, for their passionate and committed help with the preparation of this report, especially on site.

Also, Michael Kelly, Historian, for his clarification and collaboration of heritage significance.

1a - Observation Methodology. This report contains a series of plans, measurements & photographs, with observations, of the buildings that exist on the meteorological station, Beeman Base, Campbell Island, as of February 2017, with the aim of establishing a snap shot of the condition of these buildings. A "walk past" assessment was completed of the walls, roof, and foundations of these buildings with these areas photographed as appropriate. At random one position in each building was chosen to complete a detailed spot check of the condition of this single part in each building. Detailed checks were not completed of the other areas in each building.

The plans that follow in section 1 condense the large amount of information obtained on this field trip into a general form that can more easily be digested.

In section 2, the condition of each building is detailed by plans, dimensions and a written summary, with photographs of specific details also attached. The remaining photographs that could be useful, for reference purposes when work is planned, are included on a disc that is attached to this report.

1b - Historic: The Tucker Hut (figure 1-1) is the most historic building in the suite of buildings I investigated. This building provided accommodation, in part, for the World War 2 coastal watchers. It is also in the worst condition and requires a complete rebuild.

Closely following this, the Hydrogen Building (below) is very significant and provided the mechanism, (weather balloons), for obtaining weather data, and is of very high historical significance. This building is also near to a demolished from neglect . The other buildings on the meteorological base, part of the Hostel, the Technical Building, and the jetty structures, including the Marsden matting, are all of high historic significance and are all worthy of preservation. Where previously we thought one Hostel room drawn as number 7 in figure H2, for "PJ", had all the original furniture in this room, we now know that this furniture was a recent addition, and of little historical significance.

Figure 1-6
ABOVE A lot of the cladding around Beeman Base is ending its natural life. In this case the roofing has perforated.

Figure 1-7
ABOVE The historic hydrogen building, near to demolished by neglect

1c - Structure:. The condition of most buildings, behind the cladding, seems to be structurally sound. However this is not true of the Tucker Hut, Jetty Ramp Boat Shed, and to a lesser extent the Hydrogen Building, all of which are close to demolition from neglect.

For most buildings the special foundation piling systems used in the unique very soft and deep peat show little or no settlement when measured with a laser. These piles, of silver pine, are expected to last 90 years. (figure 1-17 and also figure T-19) However all buildings require minor additional fixings between the foundation piles, bearers and joists to assist in providing a small amount of earthquake resilience.

Minor additional fixings are also required on all buildings between the roof purlins, roof truss, and the wall top plate to resist cyclone winds. Fixings at present are below any new building standard minimums in situations with less wind.

Figure 1-8
BELOW The typical structure, minor modifications required to add connections to limit earthquake damage are missing, red circle.

Figure 1-9
ABOVE Corrosion on ferrous cladding material, installed post 1960,

Figure 1-10
BELOW Pure Zinc cladding, corroded to en extent that the cladding has perforated. Installed pre 1960

Figure 1-11
BELOW Pre 1955 cladding is generally in good order, for instance on these wharf buildings. However repaints may be slow in an area of high rainfall.

1d - Post 1960 cladding. This cladding together with recent materials used for maintenance, in most cases is in very poor condition. The lack of durability reflects the fact that a more economical material has been chosen. These areas need replacing in less than one decade on nearly all buildings built after 1960. In a lot of cases perforation has already occurred in one location and more, and holes that allow water into the structure are both enlarging and multiplying. With this perforation the likelihood of structural damage from rot of the timber framing inside the wall will increase exponentially.

1e - 1955 to 1960 cladding The cladding on about half the buildings constructed in this period have a better durability. However replacement is generally also required in less than one decade. These time periods are only applicable if the window shutters are replaced. (Refer section 1p) Without window shutter replacement the likely durability could be only a few years before the cladding is perforated.

The extent of re-cladding work required, from that installed from 1960 to the present day, is alarming because of the quantum of work required

1f - Pre 1955 cladding For the cladding systems on the pre 1955 buildings, only minor maintenance to ensure continued waterproofing is required.

1g - Life cycle costings. The above cladding clauses highlight a general pattern of cost savings and budget cuts over the last two decades. The recent choice of economical non-durable materials for cladding does not reflect the true life cycle cost of maintaining these buildings.

The extent of cost savings and budget restraints has now developed to an extent that, in the effort to save money, the methodology &/or materials chosen are in appropriate.

An example of this (figure 1-12) is the copper treated plywood used as window shutters around aluminium cladding. The addition of copper treated plywood shutters (**C**) has caused the aluminium to corrode prematurely, (**P**) and cladding perforation has already started to occur below the copper shutters. The aluminium away from this recent shutter addition (**E**) is displaying excellent durability and is functioning well.

Piece-meal alterations like this mean that the buildings would have been better off if nothing had been completed.

Other examples include the DoC hut, where recent timber window additions were not installed correctly (figure E6 - refer 24% ; figure E10 & E11) with a robust combination of flashings, and one window will be causing structural degradation below the window sill soon.

Also, the recent 'diesel feed' fire was flashed with non-durable flashings, and again this area will cause structural failure shortly. (Figure E12)

The flat membrane roof on the Hostel was replaced with a metal roof which has a flat or a negative slope, and water will collect at the top of the roof. (Figure H13)

The most recently constructed Cool Store has cladding that does not cover the bottom plates, and these will rot out prematurely. (Figure J4)

If suitably qualified construction personal were involved then repairs or additions would match the existing durability of the rest of the building. This also applies to adequate on-site construction supervision; so that when problems are encountered the best durable solution can be selected. The extent of cost savings and budget restraints is now at a level where in a many cases maintenance work on the buildings is detrimental, and in some cases to an extent that the buildings would have been better off if nothing had been completed.

Figure 1-12
Corrosion evident on the left hand side, where the copper treated shutters have been added above. The aluminium is in pristine condition for its age on the right hand side where there was no treated copper shutters added above.

Figure 1-13
ABOVE Parts of the accommodation used are shown in red, for a full plan refer section "Use - Feb. 2017"

1h - Use of Buildings The plans attached accurately show the present building stock. Looking at equipment stored inside the rooms on the base, it appears that roughly one quarter of the buildings have been occupied in the recent past, and February 2017 operations extended space requirements to one third of the existing building stock. The other two thirds show little sign of past occupation. This is an approximate estimate. The one third of occupied buildings are not those that are the most sound or durable, neither do they have the highest historic significance. Use of buildings seems to be determined by Departmental ownership.

1i - Use of Buildings, piecemeal maintenance, and weather. When "on board the ship" accommodation is being provided, the navy start at 7:30 or 8:00am for navy Zodiac preparation, transportation for all staff to the island is completed by approximately 9:00am, for a 9:30am start at the work face. At the end of the day the reverse happens with a roughly 3:30pm finish at the work face, decamp, then all transport operations, and navy zodiac storage, is complete by 5:00pm. A five and a half hour day is insufficient time to complete any extensive maintenance, especially with a climate of 300 days of rain per year. Short stays &/or short days and painting or re-cladding operations, between the frequent showers, cannot co-exist. To maintain just one third of the buildings in an effective way, with the quantum of re-cladding work necessary, a nine and a half hour working day would be required.

ADDITIONAL DETAILS ON PREVIOUS TOPICS

1j - Structural Condition: Most parts of the buildings are structurally sound. The special foundation piling systems used in the unique very soft and deep peat shows little or no settlement when measured with a laser. Standard construction tolerances of plus / minus 10mm were the only differences measured across the full length of each building. Most wall and roof structural systems are bearing up well, and the only structural requirement here is to add minor earthquake and cyclone fixings to improve the resilience and outcome in case of a natural disaster.

The above comments on buildings being structurally sound are not true for two buildings. The derelict Tucker Hut and the Hydrogen Building, are close to demolition from neglect. Both these buildings have high historical significance; the Tucker Hut has a very high rating. A third building, the boat shed above the boat jetty, is also structurally in very poor condition.

It is impossible to estimate the condition of all the structural members when generally these members are hidden behind cladding. Spot tests were completed in one area in each building, and at present the cladding, which in a lot of cases is ending its natural life, is not protecting the structural members, therefore structural decay is to be expected. The natural durability, or added durability of structural timbers, could not be investigated and may delay decay.

A sliding hammer with tungsten probes was used to penetrate the structural timbers. Generally the probes were difficult to hammer into the timbers, indicating a sound structure, however the electrical potential across these probes indicate inevitable decay. If these perforated cladding systems protecting the structure are not maintained or replaced within the next five years or there abouts, then the extent of structural decay will increase exponentially, with a correspondingly exponential increase in costs.

1k - Roof and Wall Cladding Condition: Apart from the Tucker Hut, nearly all the cladding systems installed at Beeman Base after 1960 will require replacement in the next 2 to 10 years. The claddings installed pre-1960 are performing well and only minor improvements are required. However, in recent decades the replacement cladding systems that have been used do not have the same durability of early cladding systems. Recently installed cladding systems are now ending their natural life (figure 1-14) at the same time as the earlier installed cladding material needs replacement. The extent of cladding replacement is extensive.

Figure 1-14
ABOVE The upper area of the cladding on the accommodation buildings, where zinc has extensively oxidised. The next stage of the corrosion cycle is perforation.

Figure 1-15
BELOW The roof of the Bulk store (N)

1L - Life cycle costings: My guess (unsubstantiated) is that the purchase of cladding and building materials is from a separate budget from that of the costs of transporting these materials to the island, and is also separate from the costs for installation. Thus considerable percentage cost savings can be made on an individual budget if non-durable cladding materials are used. This approach, however, does not reflect the true cost of maintaining the buildings. In all cases a life cycle building material cost should be used, including those factors for transportation and labour. The HMNZS Otago cost $110 million, (Radio NZ, 7:31pm 22 July 2010, Offshore patrol boat arrives*)* if this ship lasts twenty years then the cost for a two week period is about $200,000. Add to this, from figure 0-2 & 0-3, roughly 35 navy staff at roughly $70,000 per annum, gives a staffing transportation cost of $94,000 for two weeks. These two initial items give a transportation cost of just under $300,000 with many many more costs to add. So the cost for materials is minor, then labour, and then the large transport cost to add. Thus the cost per year of expected life is VERY important to limit re-builds and the present multiple building cladding replacement now required. However, if the buildings are becoming redundant, then stop gap non-durable re-cladding in the short term is justified.

One example of how an economical un-coordinated approach is detrimental to durability exists in the recent window shutter additions. (refer figure 1-12 and adjacent text) . Although installed with well-meaning intentions, if these window shutters had not been installed, and nothing had been done, then the cladding below may have lasted another decade or more. This cladding has started to perforate below the other plywood window shutters. I assume this intervention was required as a window blew out, however there are more appropriate ways to remedy this problem, like checking glass size. This also shows the importance for well qualified staff, appropriate to the task at hand. I also assume this remedy was completed as there was a limited materials budget or limited time budget, or there was not the specialist staff available to give timely advice on product selection.

1m - Immediate Use: I have only had one trip to Campbell island. However the contents of the buildings, on my review of every accessible room, give a good indication of use. From this observation a minimum requirement to provide facilities could be the:- jetty structures (Q,R,S and U) ; part of the hostel (H) ; some ancillary food, vege, and water structures (J,L) ; and parts of the Technical building required to service the aerials and climate enclosure(T).

This list does not allow for any future development, and must be read in conjunction with the heritage listings of the buildings, mentioned previously. Economies could be obtained if various different interested governmental departments can share facilities. Maybe separate locked storage facilities are required for the sole use of each government department.

1n - Design After World War II there was a brief period when a lot of governmental buildings had a window design where maximising the light penetrating into the building was more important than looking at a view when sitting down. As such nearly all windows on Beeman Base, as was common for this period, are too high to look out of when sitting. There have been numerous attempts to build platforms to raise the floor, so that occupants can see the view out of these windows that are installed too high.

Figure 1-16
BELOW Bedroom 7 "PJ" in the Hostel (H), with bespoke furniture inside, built about 1980 to 1990, here the beds are at a height that allows for views outside the window.
~~This area is of high historic significance.~~

METHODOLOGY

In addition to the detailed dimensions on the plans, the photos in this report include a scale, in red and white, either in the photo &/or both in the photo and as a scale overlaid over the photo. This provides a reference for measurements.

1o - Foundation Methodology Campbell island is covered in peat. Peat cannot support the foundations of a building, and with the thickness of this soft layer over the entire island, extra-ordinary pile lengths are required to support a light structure. Alternatively the structure needs to be supported on isolated rock outcrops. An oscillating disc laser was used to check for differential settlement of piles. Indications using this laser were that all buildings, except Tucker Hut, had piles of sufficient depth, so that each pile was most likely founded on the solid volcanic rock (basalt) layer which exists approximately between 2 and 5 metres below the surface. The inadequate piles on Tucker Hut had collapsed and the floor level variance was over 300mm in three metres.

A demountable sliding penetrometer was used to check the continuity of the density of the peat and foundation soils across the Beeman Base and Tucker Hut site. Measurements taken showed little variance in peat density between these buildings. A building can be founded on soils that can resist more than 300 kPa. In this case no special design with these soil pressures is required. For soils between 150 to 300 kPa specialist design is required. In all cases on Campbell Island soil densities could not be measured as the top layers were so soft that they were outside the building bearing pressure norms of the device used. Deep foundations, as exist generally at Beeman base, overcome this problem.

The driven piles observed at Beeman Base were either Silver Pine, (genus, Manoao) or H5 (or H6) Copper Chrome Arsenic (CCA) treated Pinus Radiata 250mm plus Large End Diameter piles. For the Silver Pine a core sample was taken through this very unusual pile type. The timber was sound throughout. In one other 120 year old historic building founded in peat, Ormondville Goods Shed, where Silver Pine driven foundations were studied, the piles had become rotten at the variable water table line, where aerobic decay and anaerobic decay coincide. Typically this rot at Ormondville was prevalent first in the center of the timber with the decayed timber then growing out to the surface. The durability of the silver pine foundations at Ormondville was between 80 to 100 years and Campbell Island has 60 year old piles.

Figure 1-17
ABOVE A silver pine pile, expected durability, 90 years, with 60 years gone. Refer also section 2H in the condition report.

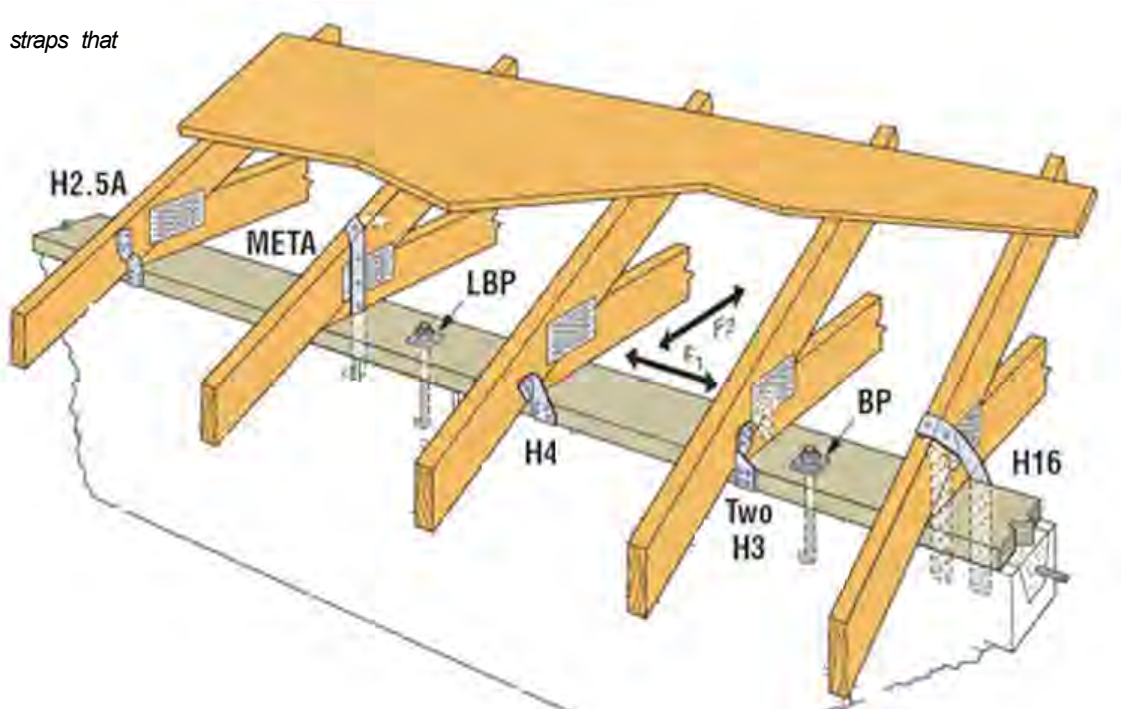
Refer also figure

1p – Structure - Details During my walk around the structural timbers appeared sound, in the areas that were readily seen. One spot check was completed in each building in areas hidden from view. The test, for durability of the structural timbers, was completed using 60mm long insulated tungsten carbide probes, driven into the timber with a sliding hammer. This leaves a 2 to 3mm hole which is usually positioned between interior wall linings. In all cases, except Tucker Hut, sound timber was encountered, as the sliding hammer took some effort to drive in the probe.

This probe was then linked to an electronic moisture meter for measurements at the center of the structural member. In roughly half the buildings moisture readings of 30% RH or more were measured. This means that the cladding system has failed. These leaks also mean that decay and the degradation of the structural timbers is inevitable unless the timber has a very high durability rating. In nearly all cases in New Zealand, structural timbers in this position do not have a high durability, however given the other aspects of pre-1950 and post-1950 construction I would not be surprised if high durability timbers were used in this case.

All junctions of wall to roof, and foundations to wall, did not meet the new building standards, and also past 1980's building standards. The timber piles to floor / wall junctions were of most concern, as a small earthquake can dislodge the building foundations from the building floor. After such an earthquake event the buildings are inhabitable as the piles puncture the floor and dislodge the floor joists. Human survival in such a building failure is common, however the corrective action required to restore the building is difficult.

Figure 1-18
BELOW Different cyclone straps that could be used for the roof



1q – Wall Cladding - Details Tucker Hut has deteriorated to such an extent that a complete rebuild is required. Refer section 2V.
Before 1950, the timber bevel back weatherboard wharf building cladding material chosen was a heart timber of some sort and most areas are in good condition. Apart from some inappropriate metal flashings, I could find no cladding decay. However with high rainfall and high humidity, painting would be problematic and this construction material would have been discouraged in future.
In the 1950's, when Beeman Base was built, the wall cladding was such a superior grade of aluminium that when un-touched, this aluminium shows no signs of oxidisation and surface decay in February 2017. Unfortunately, where the plywood shutters have been installed, these copper treated shutters are causing the premature decay of the aluminium cladding below
A few decades later, maybe between 1960 and 1990's, a pure zinc cladding was used. This cladding has extensive oxidisation and is starting to perforate. Extensive perforation is expected in the next 2 to 8 years.
Recently painted mild steel has also been used as a cladding material and extensive areas of red rust can be observed. Red rust will quickly lead to a perforated cladding.
The above four paragraphs describe a linear pattern, where the more recent cladding installed has been the least durable. Recently installed cladding now needs replacement at the same time as cladding installed in the 1950's.
Within the last few years the windows around the aluminium clad buildings have had shutters added. As discussed previously, and as explained in detail in the following section, these shutters are leading to the decay of the aluminium cladding.
Also discussed previously, the expense of transporting materials to Campbell Island, and the isolation, needs to be incorporated into the total cost of construction work, .

Figure 1-19
ABOVE Cladding corrosion at the base of a wall.

1r – Window Shutters - Details Anecdotal advice was that these shutters were installed by a heating engineer after one window blew out. Typically if a glass window blows out it is an unusual occurrence. It could be caused by a combination of location, near a corner of a building, and errors in measurement, the glass not being of adequate size to bite fully into the frame. Without further study, my recommendation (had I known about this incident) would be to merely replace the glass in the window concerned. Gather all the pieces of broken glass together so that the glass size could be measured, and compare this to the windows size to check if there had been any measurement error. The rest of the windows should be monitored, and if possible the glass to window size checked. Adding copper treated plywood over the windows as shutters, to protect the structural integrity of the window, has led to early cladding decay.
The installation of materials by untrained trades persons, *e.g. a heating engineer installing window shutters*, is also of concern. Correctly qualified staff would have seen the problems associated with the combination of aluminium cladding and copper plywood shutters.
Volunteers come under the same category, and it is important to ensure they are led by appropriately qualified staff with the right skills. This will ensure durability is maintained.

1s - BUILDING COMPARISON – TABULAR SUMMARY To compare buildings, I have applied three systems as a comparison:- Heritage, Condition, and Use. For Use, this is my estimate based on the limited single trip I took to Campbell island and observations of equipment inside the spaces. It assumes there is no change to the number of 600 over night stay

HERITAGE The buildings that are the most significant, that tell the story of development on the island, have received the highest rating. Recent additions have received the lowest rating. In order, highest to lowest, I would rank all buildings as follows, with 5 being of special significance, 4 high and above average significance, 3 historically significant, 2 neutral, and 1 is detrimental. In Michael Kelly's report, a 5 would equate to three highs in his heritage tables, and a 2 would equate to three lows

HERITAGE - SIGNIFICANCE	5 High High High	4 High . Significant	3 Significant	2 Low, Low Low	1 Detrimental
A Aurora house		4			
B Ionosphere hut foundations			3		
C Seismic hut foundations			3		
D Geomagnetic hut foundations			3		
E DoC Hostel				2	
F DoC Hostel Extension				2	
G Hostel – Annex				2	
H Hostel		4			
J Water tanks		4			
K New Cool Store				2	
L Carpenters Shop & Vege store		4			
M Masts and foundations		4			
M Sky Camera foundations		4			
M Chook Shed foundations		4			
N Bulk Food Store		4			
O Trolley Track				2	
P Marsden matting		4			
Q Boat Shed – Jetty ramp			3		
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Building		4			
U Jetty & Crane		4			
V Tucker Hut	5				
W Generator House				2	
X Bulk Oil Storage				2	
Y Hydrogen Building		4			
Z Climatological Enclosure		4			

building use table

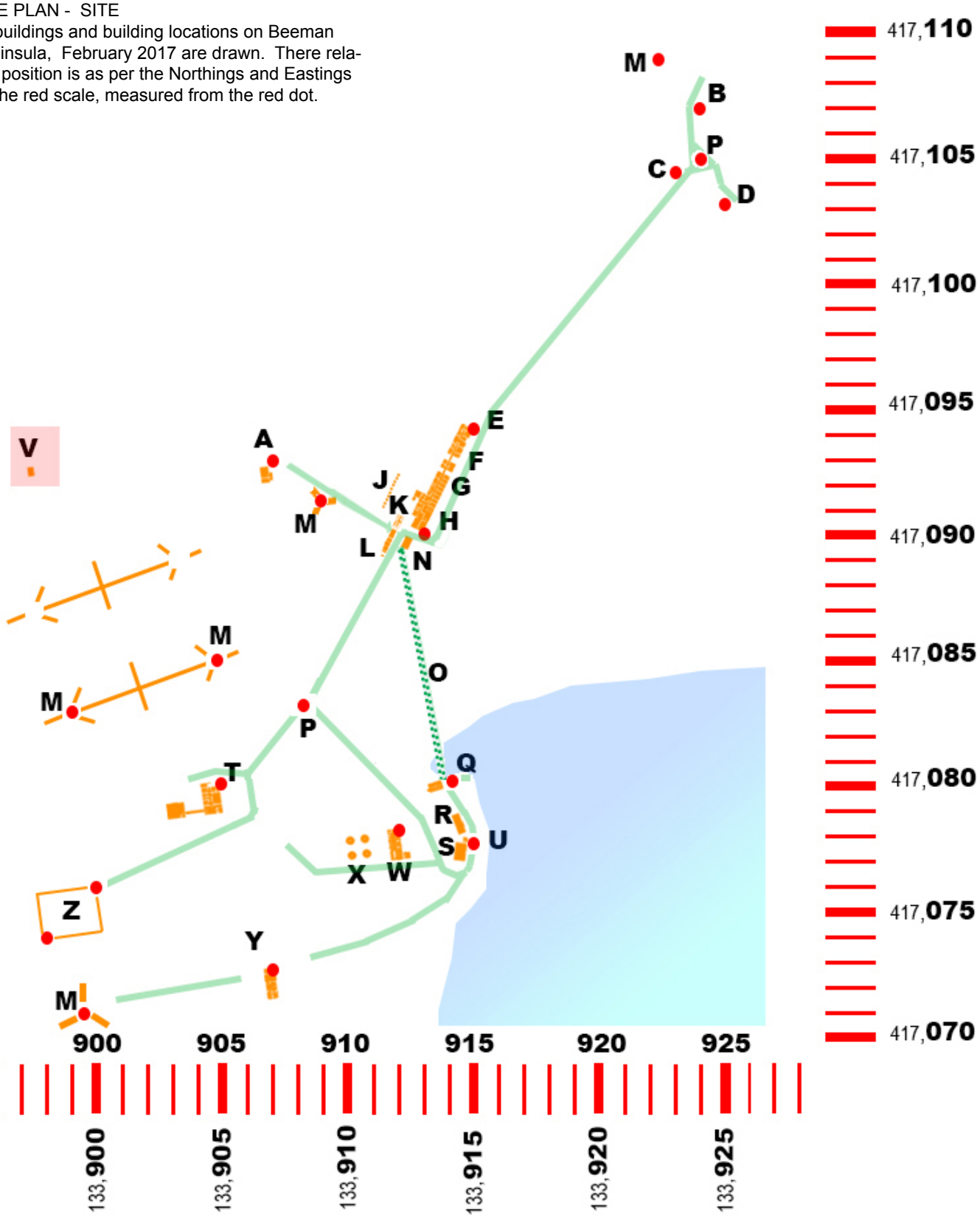
CONDITION The buildings that are in the best condition. In order, highest to lowest, I would rank all buildings as follows with :- 5, being of as new condition meeting the Present Building Codes (PBC); 4, Close to the PBC and some maintenance is required; 3 re-cladding is required soon; 2 close to derelict; and 1 ground work and clearing of scrub, and interpretative signs, are the only required.

CONDITION – Close compliance to - Present Building Codes PBC	5 Meets PBC	4 Close to PBC. Maintenance required	3 Recladding work required	2 Close to derelict	1 Ground work only required
A Aurora House			3		
B Ionosphere hut foundations					1
C Seismic hut foundations					1
D Geomagnetic hut foundations					1
E DoC Hostel			3		
F DoC Hostel Extension			3		
G Hostel – Annex			3		
H Hostel		4			
J Water tanks			3		
K New Cool Store		4			
L Carpenters Shop & Vege store		4			
M Masts and foundations					1
M Sky Camera foundations			3		
M Chook Shed foundations					1
N Bulk Food Store			3		
O Trolley Tarck				2	
P Marsden matting				2	
Q Boat Shed – Jetty ramp		4			
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Building		4			
U Jetty & Crane					
V Tucker Hut				2	
W Generator House		4			
X Bulk Oil Storage			3		
Y Hydrogen Building				2	
Z Climatological Enclosure					1

USE The buildings that are required, from my single trip, are ranked. In order, highest to lowest, I would rank all buildings as follows, with 5 showing use all year around, 4 showing some signs of recent intermittent occupation, column 3 is not used, 2 indicates little use, and 1 the area is derelict or un-useable.

USE As of Feb 2017	5 Required year around	4 Used, Feb 2017	3 Able to be used, but no evidence of use.	2 Derelict	1 Not ap-plicable
A Aurora house			3		
B Ionosphere hut foundations					1
C Seismic hut foundations					1
D Geomagnetic hut foundations					1
E DoC Hostel		4			
F DoC Hostel Extension			3		
G Hostel – Annex			3		
H Hostel			3		
J Water tanks		4			
K New Cool Store			3		
L Carpenters Shop & Vege store		4			
M Masts and foundations					1
M Sky Camera foundations					1
M Chook Shed foundations					1
N Bulk Food Store			3		
O Trolley Track		4			
P Marsden matting		4			
Q Boat Shed – Jetty ramp		4			
R Paint-Spirit Shed (Ex Mech. Shed)		4			
S Jetty Store		4			
T Technical Build – generally			3		
T Technical Build – Climate gear	5				
U Jetty Crane			3		
V Tucker Hut				2	
W Generator House			3		1
X Bulk Oil Storage			3		1
Y Hydrogen Building				2	1
Z Climatological Enclosure	5				1

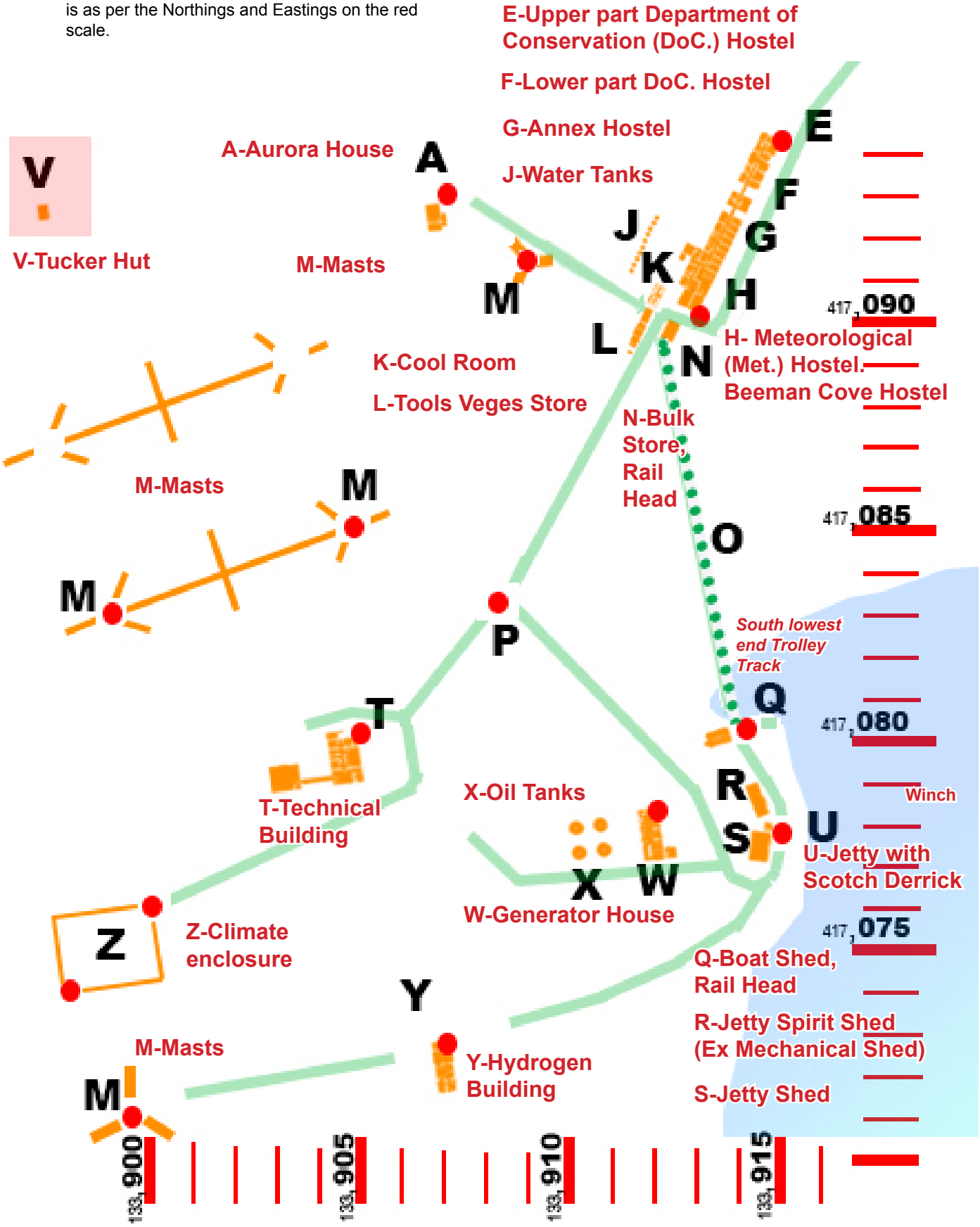
SITE PLAN - SITE
All buildings and building locations on Beeman Peninsula, February 2017 are drawn. There relative position is as per the Northings and Eastings on the red scale, measured from the red dot.



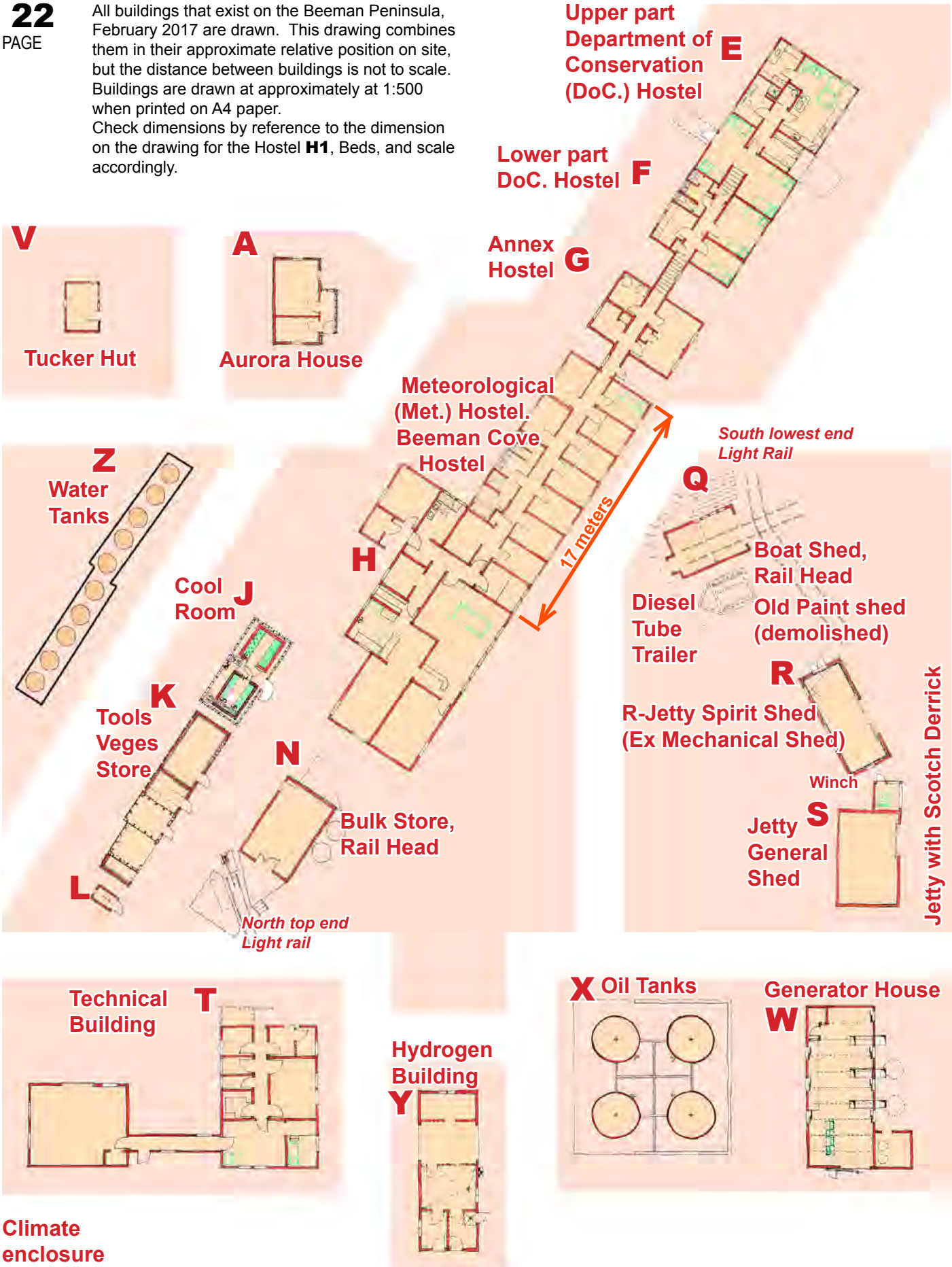
SITE PLAN - SITE
Table of the Northings and Eastings, on the previous site plan.
Letters in the far right hand column correspond to the letters on the plan.
The yellow highlight shows different ways of measuring the same point, as reviewed by Land Information (LINZ)

Campbell Island GPS readings. DoC New Plymouth GPS	File 1601-E-Site Plans Northing	Easting	
Iono Mast	417 1092	133 9224	M
Ionoshere Hut	417 1076	133 9248	B
Triangular track traffic island	417 1052	133 9242	P
Magneto Hut	417 1037	133 9251	D
Seismic Hut	417 1047	133 9229	C
DoC Hut, NE corner	417 0954	133 9169	E
DoC Hut, 2 hours later	417 0946	133 9158	E
Hostel -Met Accom, SE Corner	417 0902	133 9136	H
Green aerial to Aurora Hut	417 0909	133 9107	M
Aurora Hut, NE corner	417 0930	133 9075	A
Technical Building, NE corner	417 0807	133 9055	T
Main Track "Y" junction	417 0833	133 9089	P
Ano Mast	417 0710	133 8989	M
Jetty Store, NE corner	417 0777	133 9151	S
Generator Shed, NE corner	417 0786	133 9127	W
Hydro Generator shed, NE crn	417 0725	133 9071	Y
Boat ramp rail track Trident junction-DoC WGS-84	417 0807	133 9138	Q
Topo Map 169deg09'08"		52deg33'00"	
LINZ NE-ings Campbell Island Mercator System	417 5400	351 0300	
Comms mast to NZ, Main mast SE	417 0840	133 9051	M
Comms mast to NZ, Main mast SW	417 0834	133 8985	M
Met Climate Instrument square, NE crn	417 0765	133 8998	Z
Met Climate Instrument square, SW crn	417 0740	133 8971	Z

SITE PLAN - BUILDINGS
All buildings that exist on the Beeman Peninsula, February 2017 are drawn. There relative position is as per the Northings and Eastings on the red scale.



All buildings that exist on the Beeman Peninsula, February 2017 are drawn. This drawing combines them in their approximate relative position on site, but the distance between buildings is not to scale. Buildings are drawn at approximately at 1:500 when printed on A4 paper.
Check dimensions by reference to the dimension on the drawing for the Hostel **H1**, Beds, and scale accordingly.



building stock

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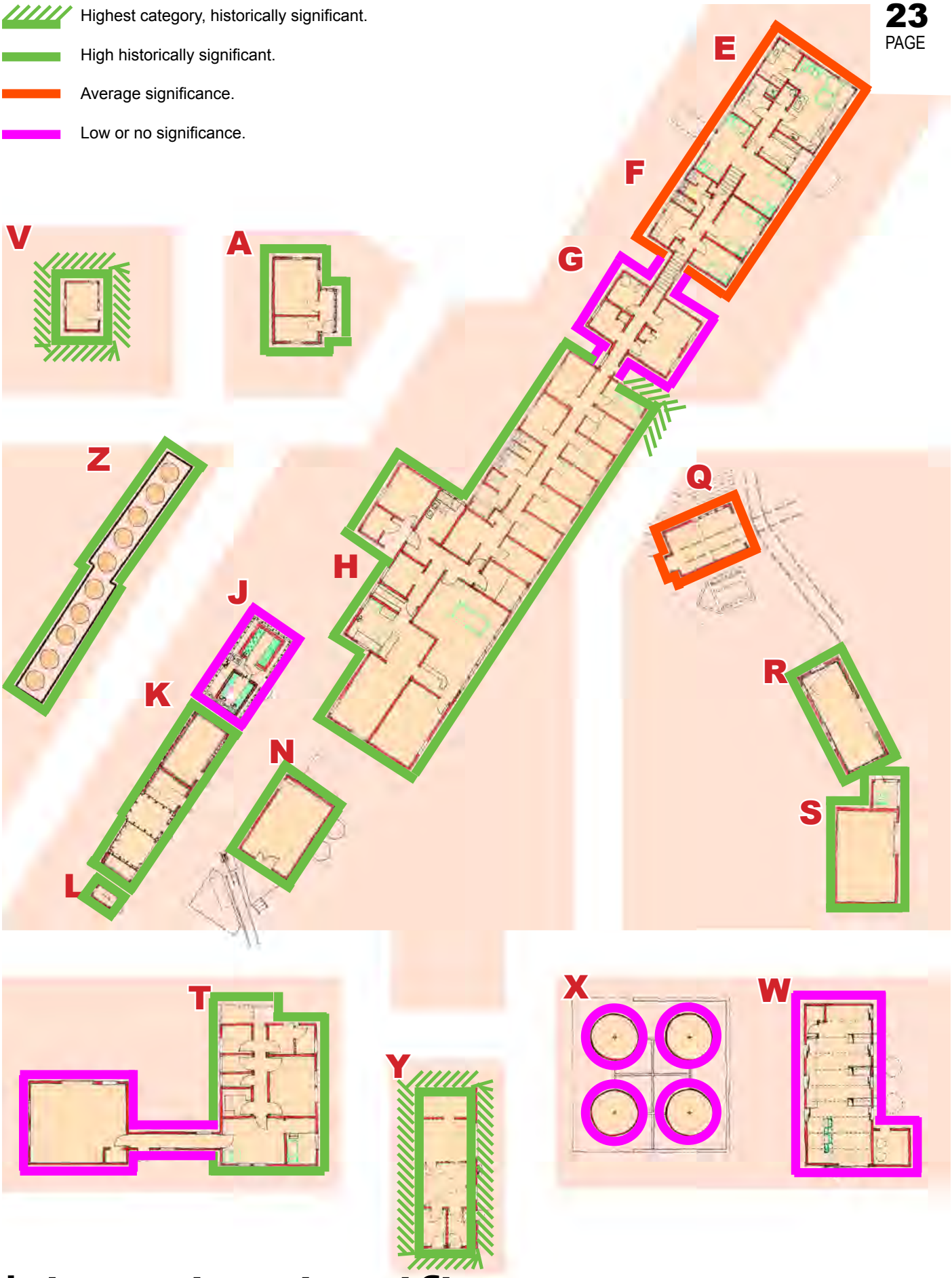
campbell island-METEOROLOGICAL STATION

Highest category, historically significant.

High historically significant.

Average significance.

Low or no significance.



historic significance

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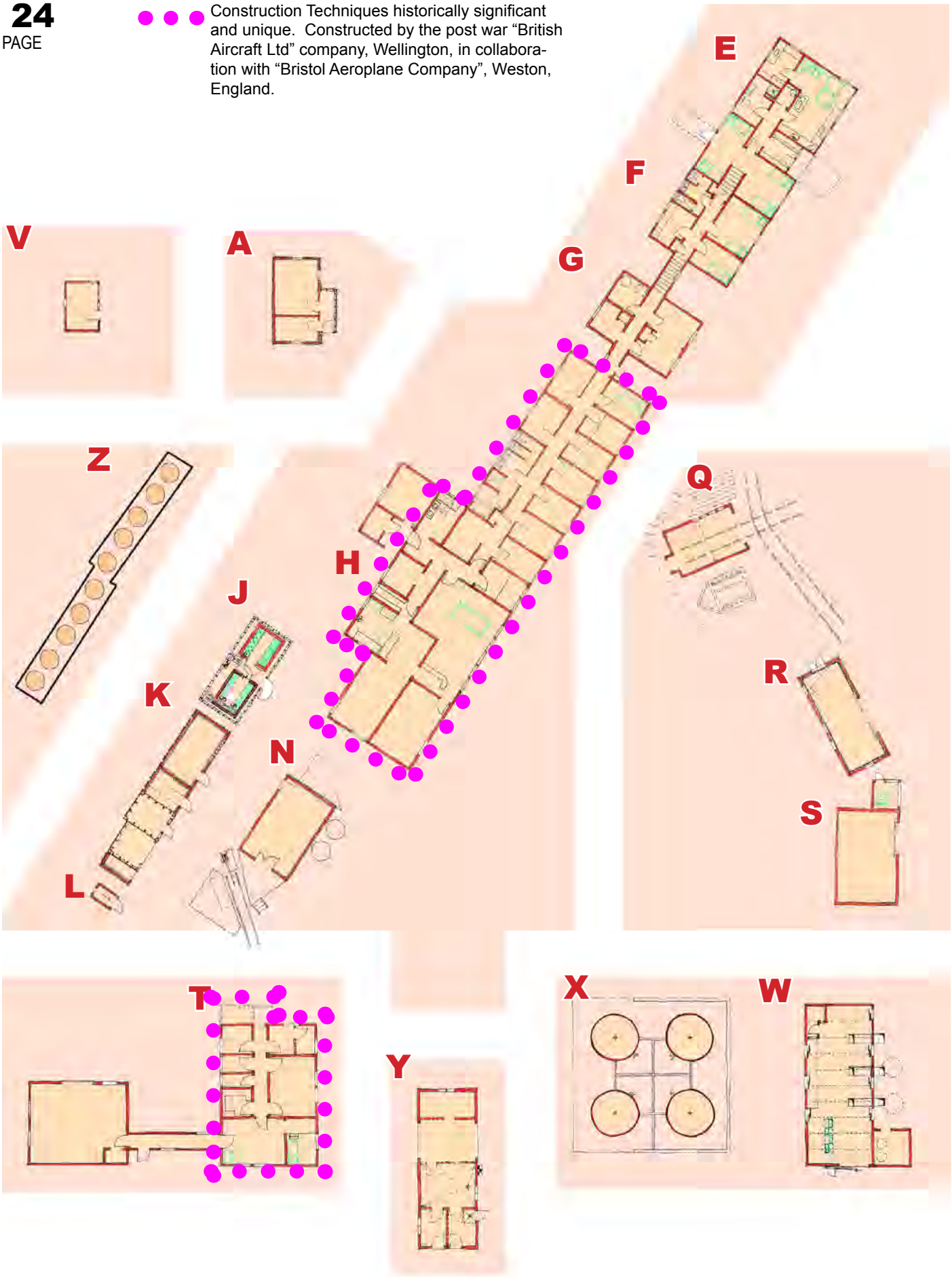
campbell island-METEOROLOGICAL STATION

Construction Techniques historically significant and unique. Constructed by the post war “British Aircraft Ltd” company, Wellington, in collaboration with “Bristol Aeroplane Company”, Weston, England.



unique construction

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campbell island-METEOROLOGICAL STATION

Near to demolished by neglect.

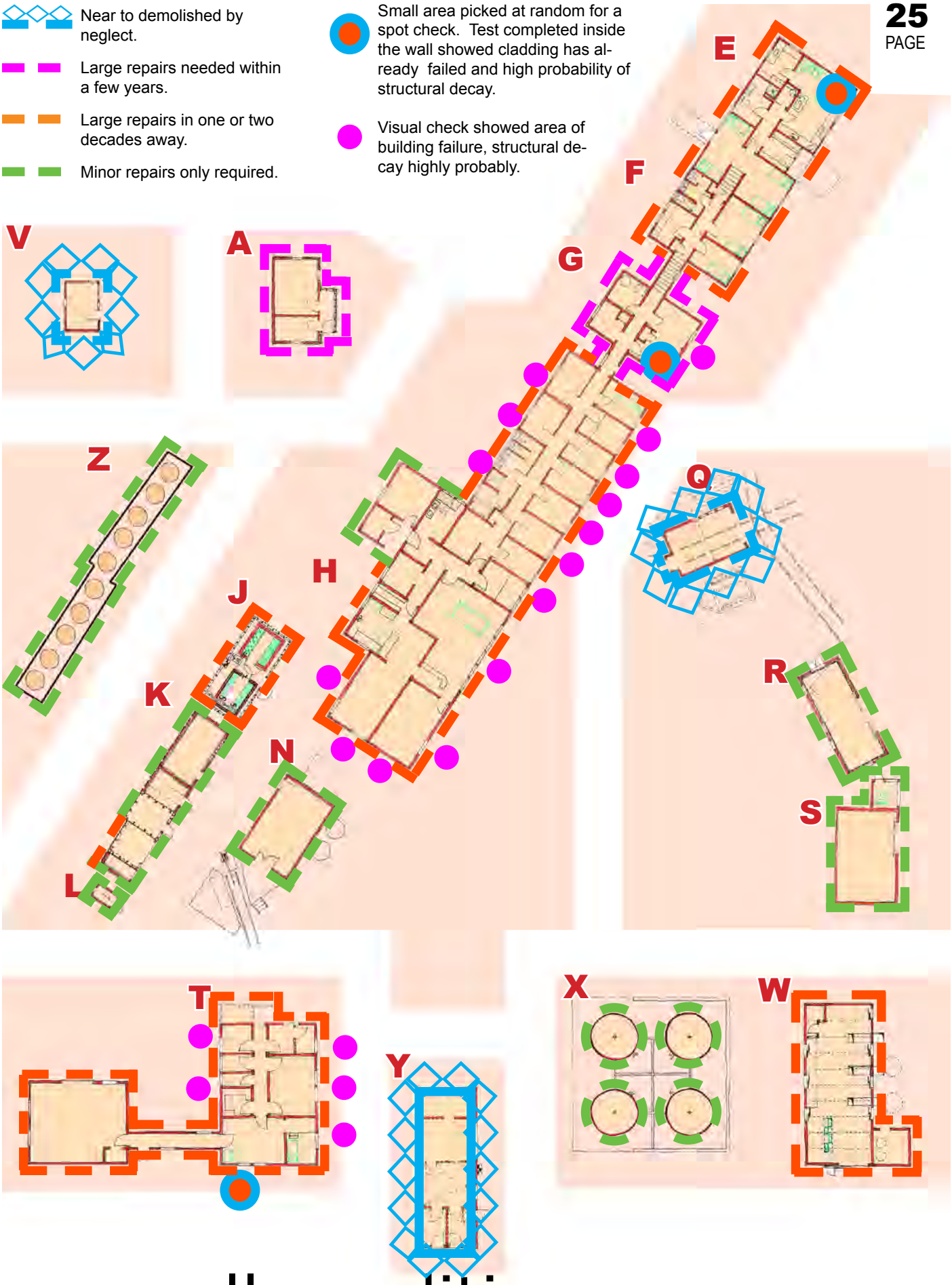
Large repairs needed within a few years.

Large repairs in one or two decades away.

Minor repairs only required.

Small area picked at random for a spot check. Test completed inside the wall showed cladding has already failed and high probability of structural decay.

Visual check showed area of building failure, structural decay highly probably.

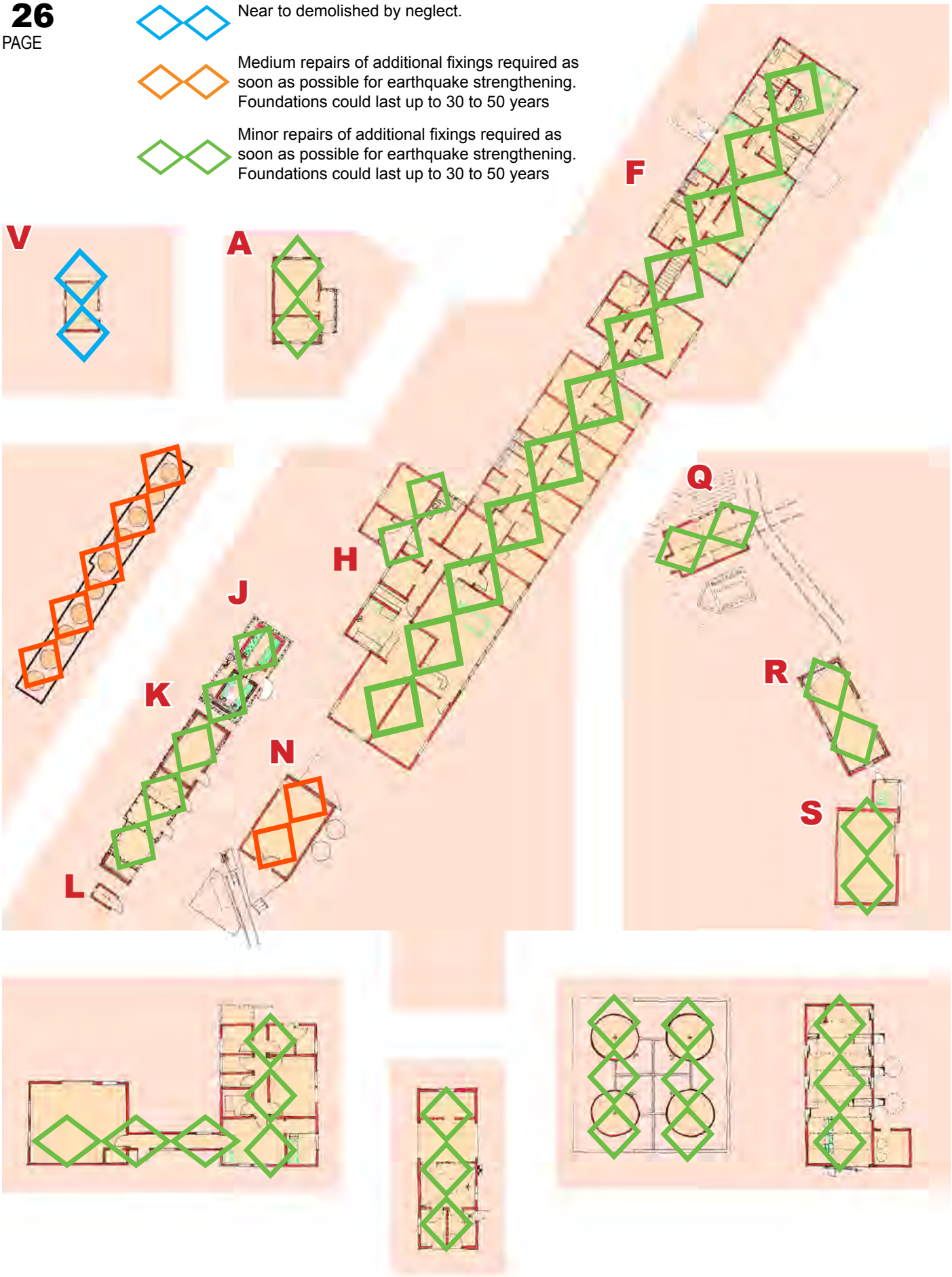


wall condition

Near to demolished by neglect.

Medium repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years

Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years



foundation condition

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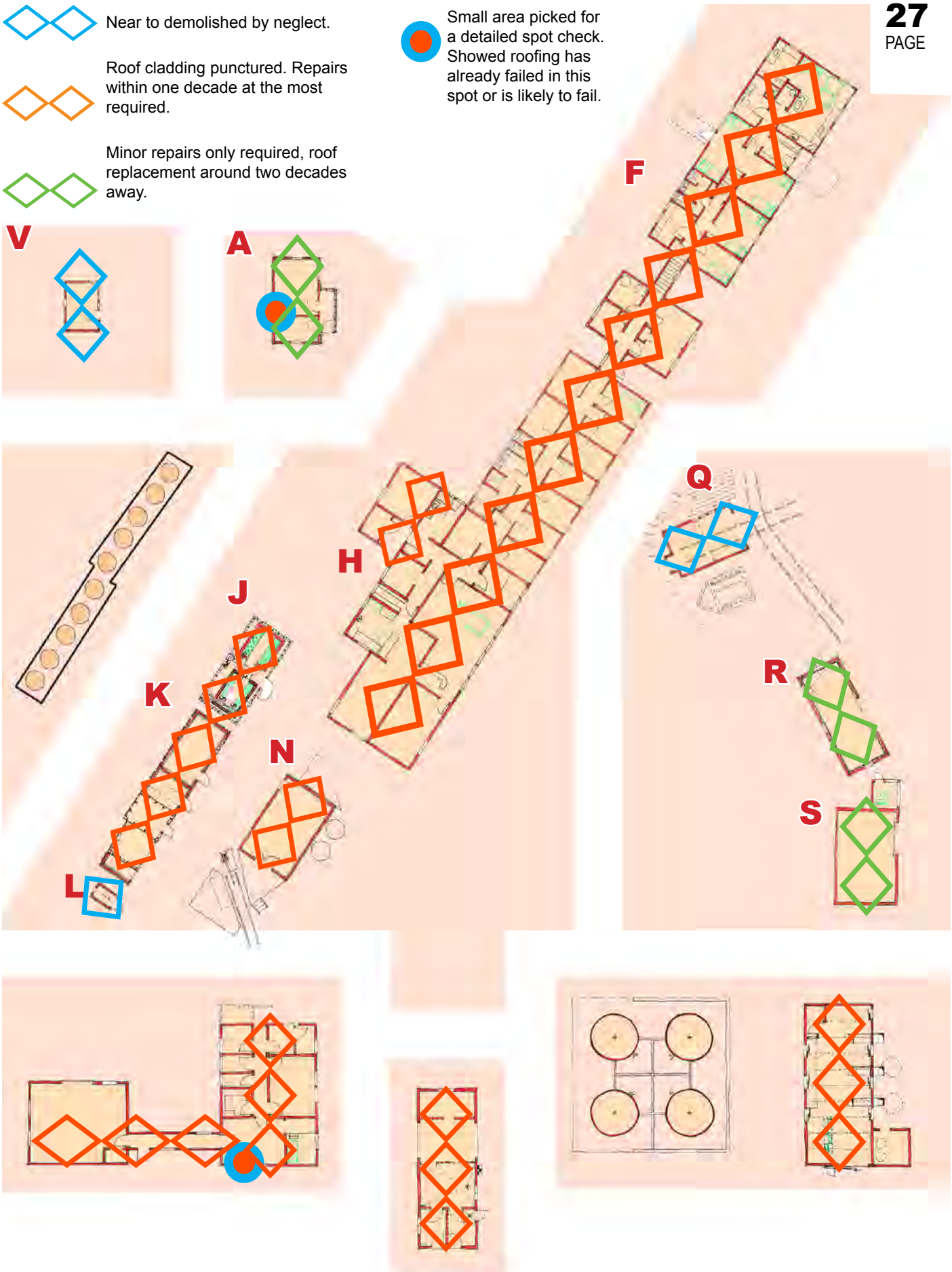
campbell island-METEOROLOGICAL STATION

Near to demolished by neglect.

Roof cladding punctured. Repairs within one decade at the most required.

Minor repairs only required, roof replacement around two decades away.

Small area picked for a detailed spot check. Showed roofing has already failed in this spot or is likely to fail.



roof condition

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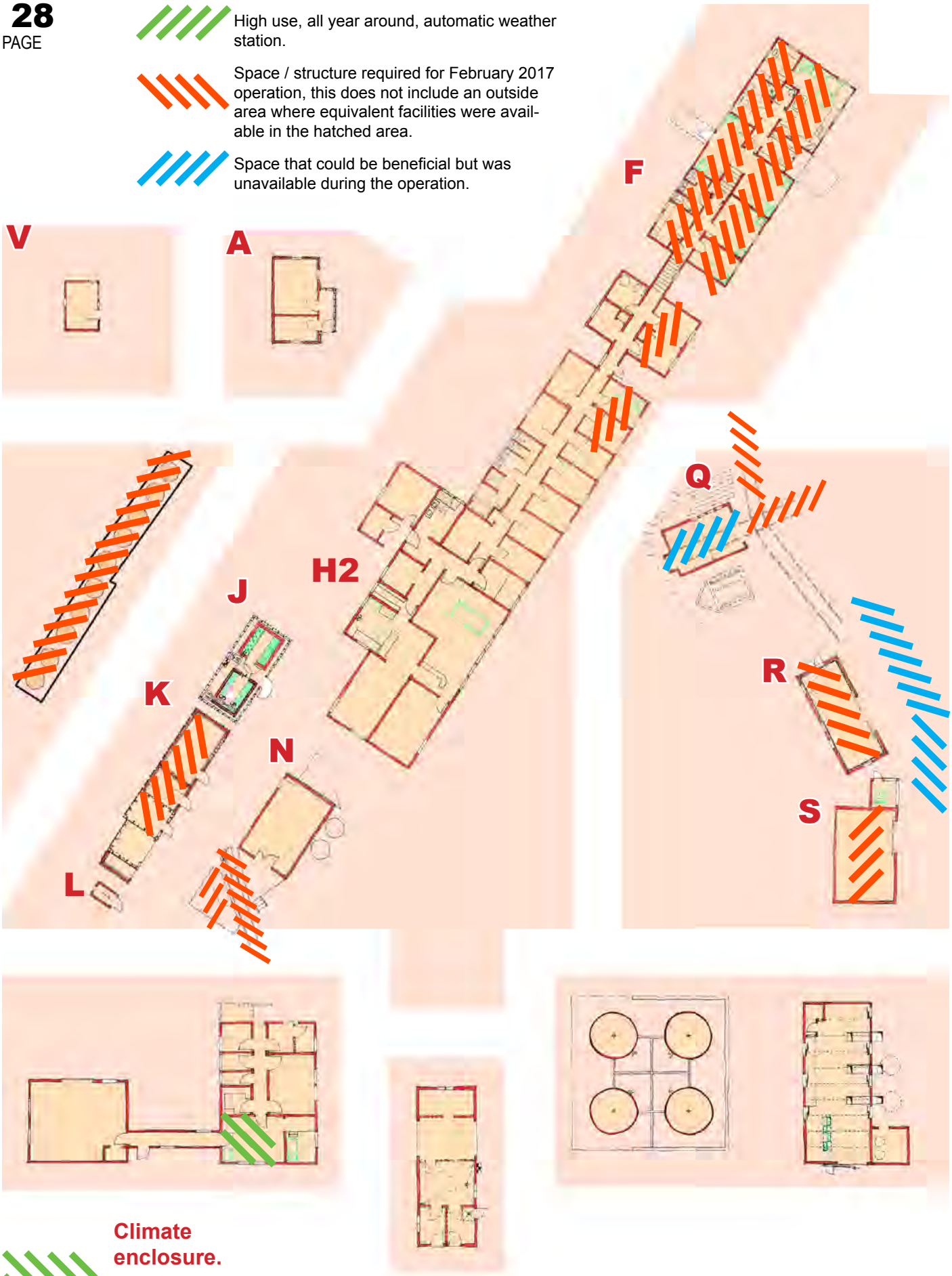
campbell island-METEOROLOGICAL STATION

High use, all year around, automatic weather station.

Space / structure required for February 2017 operation, this does not include an outside area where equivalent facilities were available in the hatched area.

Space that could be beneficial but was unavailable during the operation.



Climate enclosure.

use, feb. 2017

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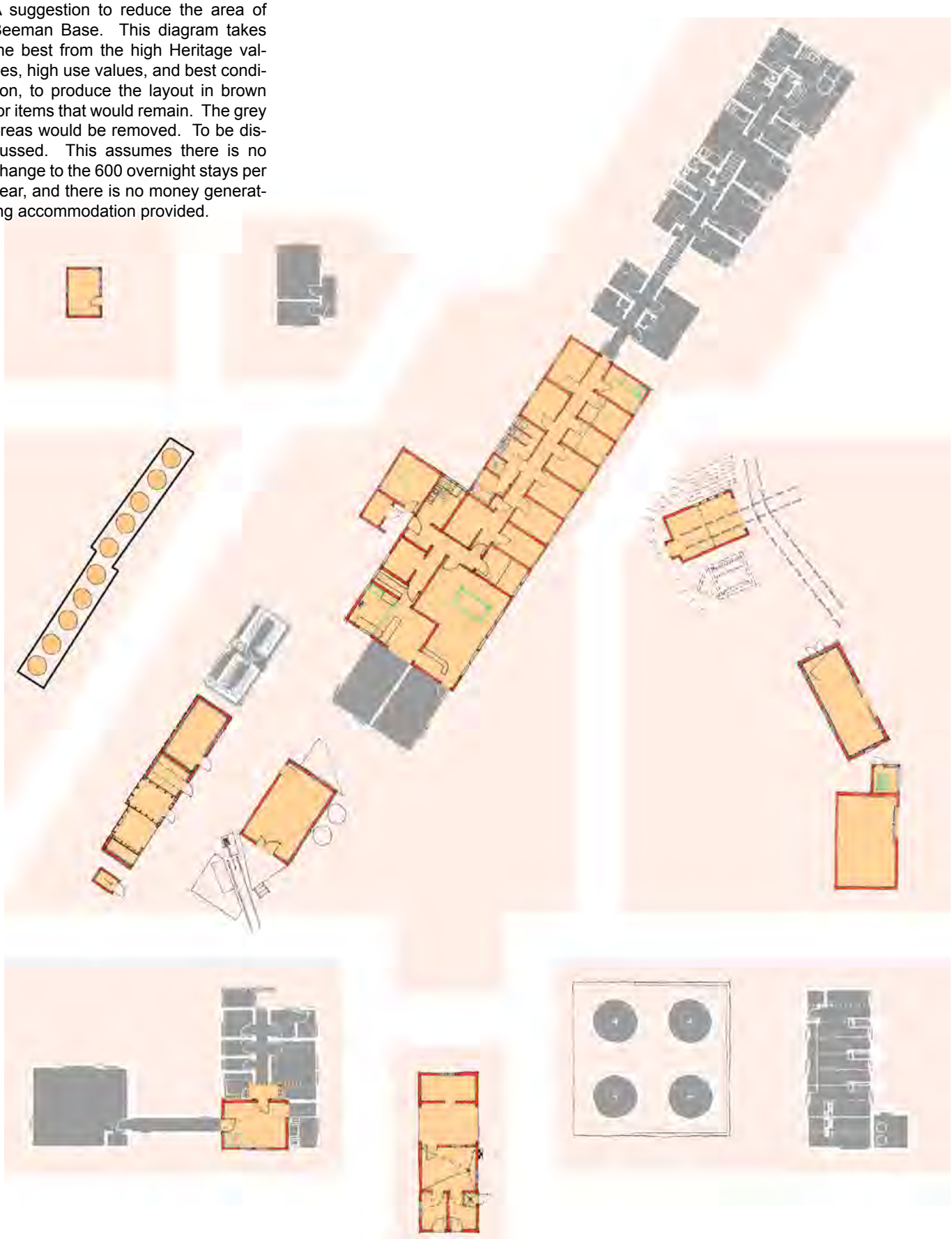
campbell island-METEOROLOGICAL STATION

SUMMAR 1

SUGGESTED USE. For discussion. A suggestion to reduce the area of Beeman Base. This diagram takes the best from the high Heritage values, high use values, and best condition, to produce the layout in brown for items that would remain. The grey areas would be removed. To be discussed. This assumes there is no change to the 600 overnight stays per year, and there is no money generating accommodation provided.



suggested use

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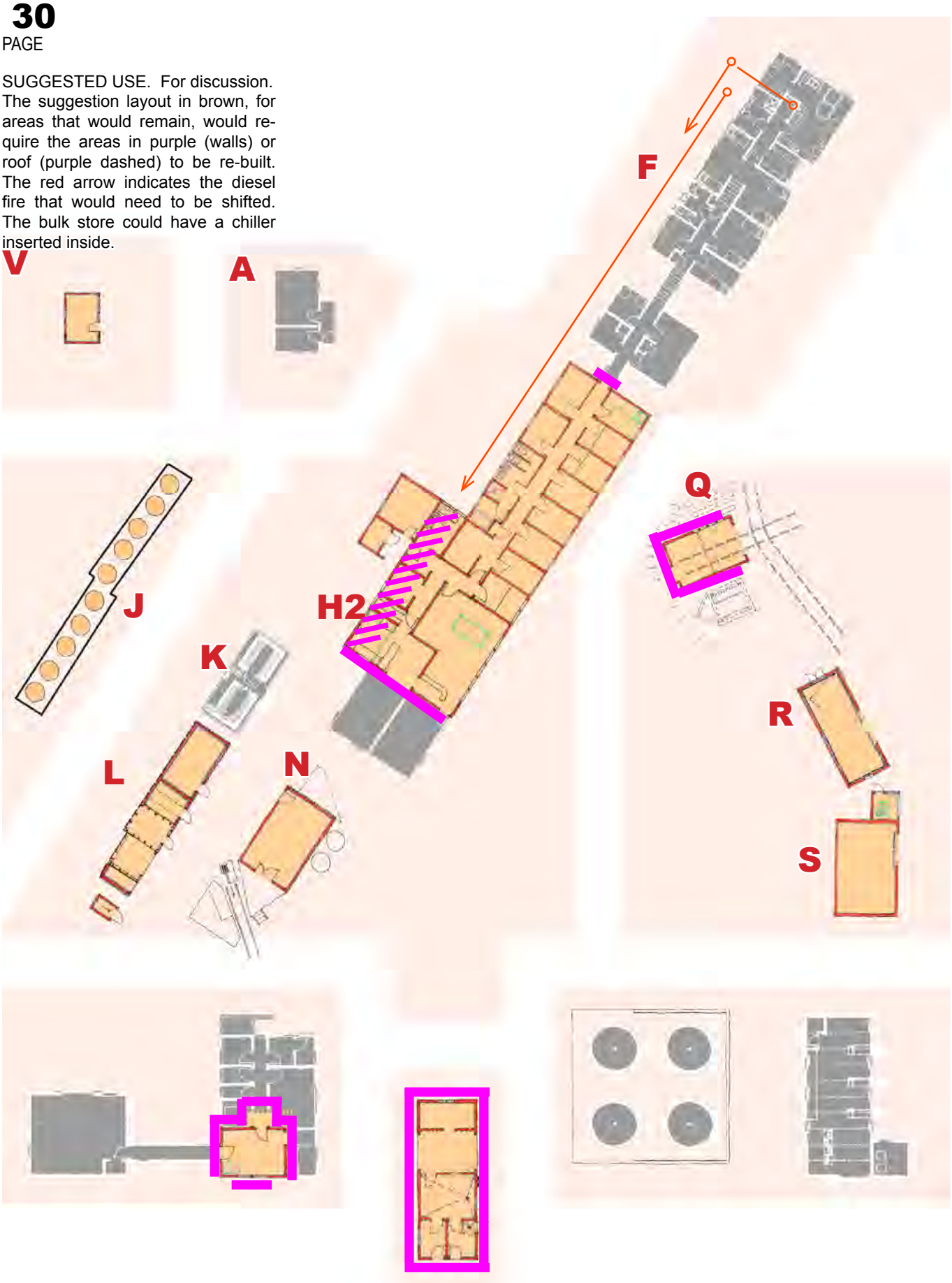
campbell island - METEOROLOGICAL STATION

SUGGESTED USE. For discussion. The suggestion layout in brown, for areas that would remain, would require the areas in purple (walls) or roof (purple dashed) to be re-built. The red arrow indicates the diesel fire that would need to be shifted. The bulk store could have a chiller inserted inside.



work required for use

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campbell island-METEOROLOGICAL STATION

2.0 CONDITION

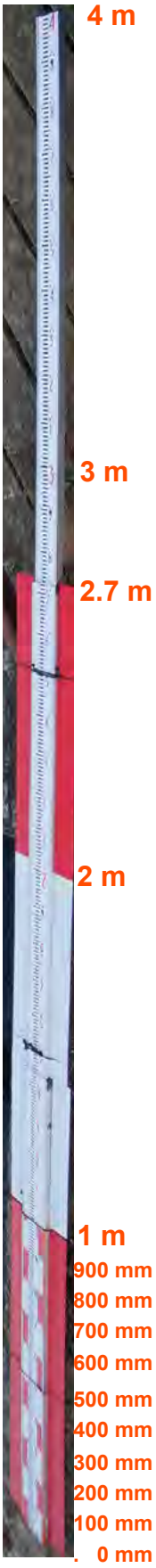
The following section comments on the condition of each building.

Numbered as per the site plan on the following page.

The red box to the right is a one meter scale, so that the photos can be used for measurement. As photos are at slightly different sizes the scales will alter with every photo, and also alter due to perspective. Generally photos are taken to reduce the effects of perspective as much as possible.

The two bottom sections of the scale in the photos is accurate for one metre, however the top section needed to be truncated and is 800mm high

The table of huts, letter to hut name, is listed on the following page.



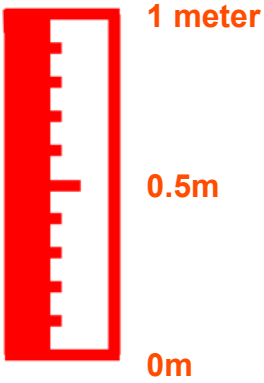
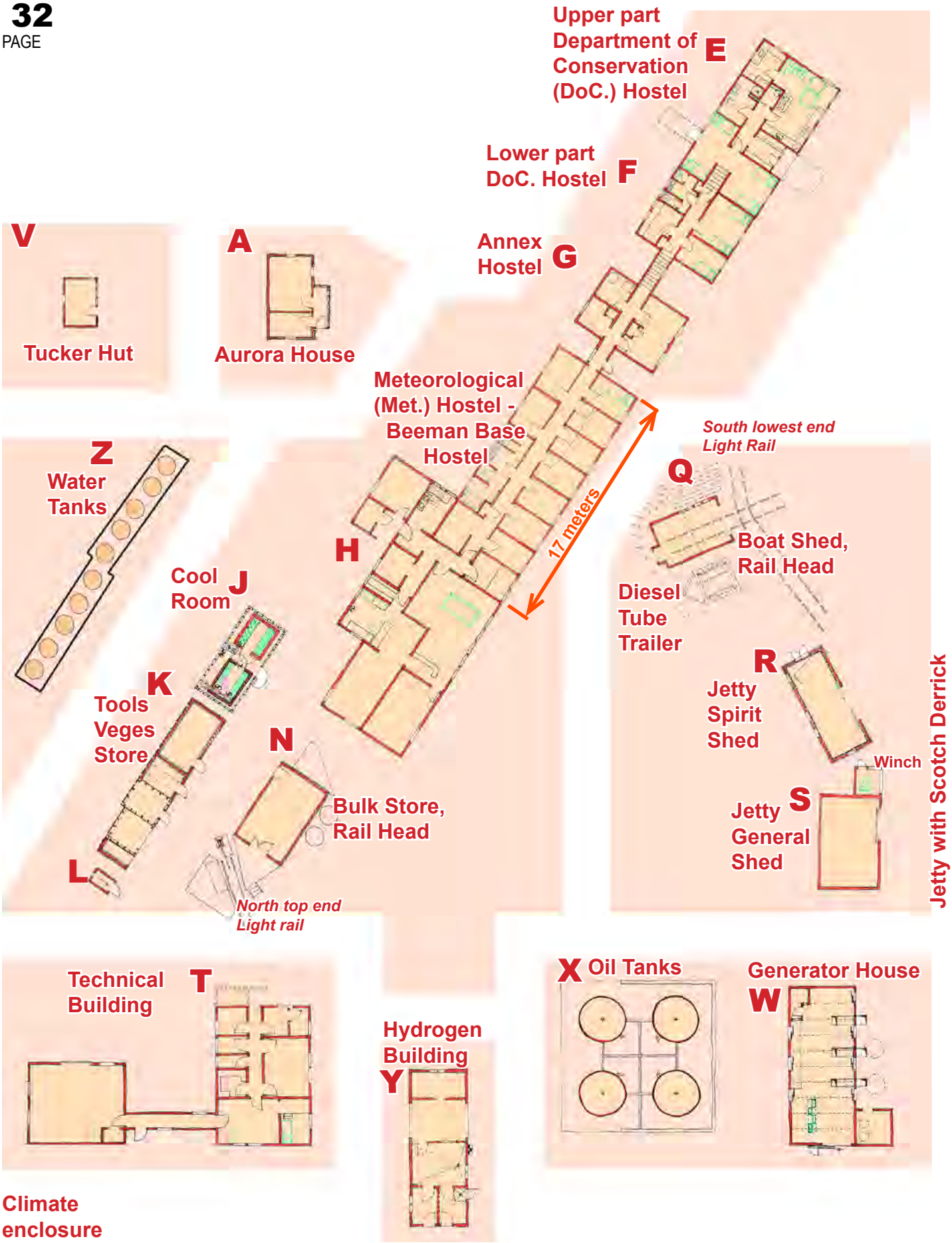


Figure 2-1
ABOVE Corrosion evident on numerous cladding materials

Figure 2-2
LEFT Condition of the historically and most highly significant building, the Tucker Hut.



building codes

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campbell island-METEOROLOGICAL STATION .

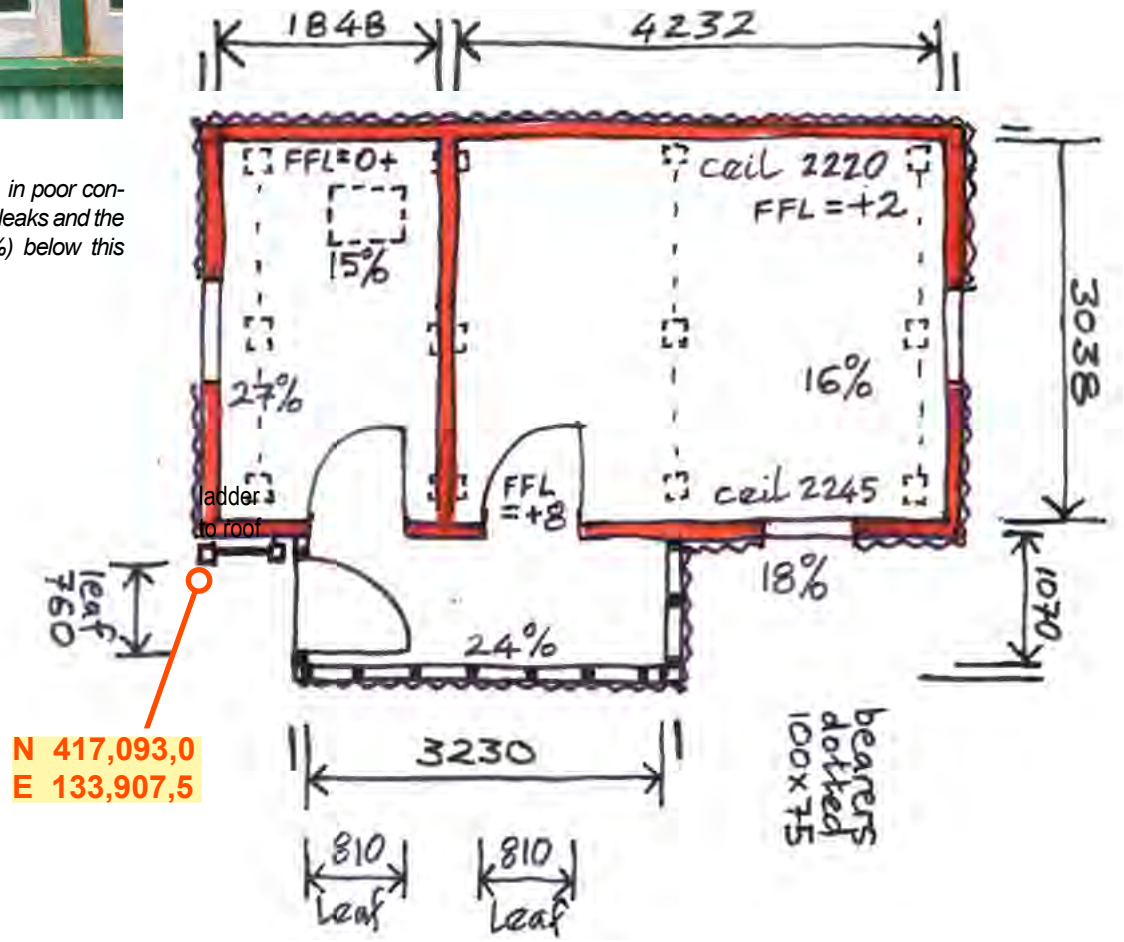
CONDITION 2

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Large repairs needed within a few years. Test completed inside the wall showed cladding has already failed and high probability of structural decay.
Foundation condition	Foundations could last up to 30 to 50 years Minor repairs of additional fixings required
Roof condition	Minor repairs required,
Use, Feb 2017	No use during February 2017.

Figure A1 ; A2 ; A3 ; A4
The four elevations of Aurora Hut.
The patches are where the plastic cladding, added over the previous, have cracked and deteriorating.
The timber cladding below was leaking before the plastic over -clad.

Figure A5
ABOVE -The south window, in poor condition. This will be leading to leaks and the high moisture content (27%) below this window.

Figure A6
RIGHT -Aurora Floor Plan



N 417,093,0
E 133,907,5

aurora hut

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campbell island-METEOROLOGICAL STATION .

CONDITION 2A

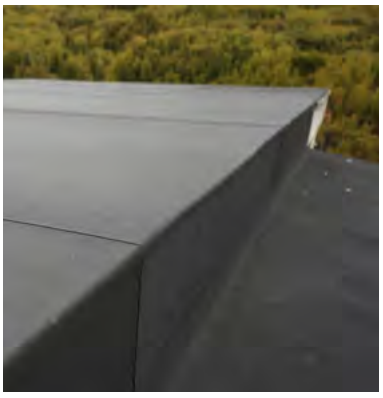

Figure A8 ; A9 ; A10
The roof membrane is in good condition, but very poor detailing around all the edges means that the roof will leak &/or peel off in high winds.
The skylight has no upstand and this will lead to inevitable decay if no corrective action is completed.

Figure A7
TOP The foundations "as is" and BOTTOM the position of the additional stub stud required is drawn in yellow below. This will assist in earthquake resilience.

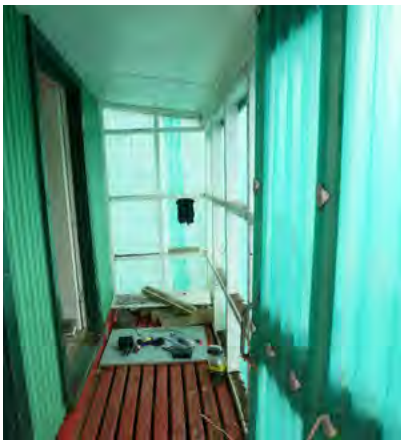

Figure A11
ABOVE The open porch

Figure A12
ABOVE RIGHT - The smaller room, with the leaking window to the left. The skylight is above the desk.

Figure A13
RIGHT -The larger room

Historic significance	Average significance.
Foundation condition	Regular mowing would assist with interpretation

Figure B1
AZIMUTH HILL ROCK
MOUBRAY - LYALL
BEEMAN
N'EAST H'BOUR

Figure B2
The location of the Ionosphere Hut, at the end of Ionosphere way. Photo taken from near the path "Y" junction to the geomagnetic hut location.

ionosphere hut

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campbell island-METEOROLOGICAL STATION

2B CONDITION

N 417,105,2
E 133,924,2

Historic significance — Average significance.
Foundation condition — Regular mowing would assist with interpretation

CLIFTON MEMORIAL
GEOMAGNETIC OBSERVATORY

Figure C1
ABOVE The "Clifton Memorial" sign at the end of "Ionosphere way" just past the location of the Seismic Hut. The text of the sign, just visible, is printed to the left.

N 417,104,7
E 133,922,9

Figure C2
ABOVE The end of "Ionosphere way" The seismic hut location is on the left.

CONDITION 2C

seismic hut

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campbell island-METEOROLOGICAL STATION

Figure D1
RIGHT "Clifton Memorial" sign. Letters underlined are hard to read
IN MEMORY OF
LESLIE CLIFTON
DIED IN AN AIRCRAFT ACCIDENT
NEW ZEALAND 1951
LEADER OF CAPE EXPEDITION
1942
MINING ENGINEER - SURVEYOR

Figure D2
RIGHT Still visible are the Tripod measuring instrument stands that were below the geomagnetic hut floor.

Figure D3
BELOW The Geomagnetic Hut excavation.

Figure D3
FAR RIGHT Plan of the foundations of the Geomagnetic Observatory foundations
Footprint, approximately 3.0m high.

geomagnetic observ.

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campbell island-METEOROLOGICAL STATION

2D CONDITION

Historic significance Low or no significance.
Construction Standard New Zealand wide common construction techniques

Wall condition
Re-cladding needed within one decade. Zinc wall cladding shows extensive areas of white rust. Visual checks showed areas of cladding where failure will occur soon, then decay of structural members inside wall highly probable. Time period of structural failure depends on durability of timber.
Test completed inside the wall showed elevated moisture around recently installed window. This recent additional work has already failed with a high probability of structural decay inside wall. Repairs here required now. No faults or decay found with original aluminium window installation installed decades previously. Decay inside wall depends on durability of timber.

Figure E1
Hostel, DoC end. The original alum windows are brown, and the assumption is that the recently added timber windows, (which are leaking) are white

Foundation condition
Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years. The partical board flooring has a limited life as it is exposed to intermittent high moisture levels.

Roof condition Roof cladding punctured and repairs required now. Re-cladding required within one decade at the most. Minor repairs required. A small area was spot checked in detail, this showed roofing already failed in this spot

Use, Feb 2017 Space required for February 2017

Figure E2
LEFT TOP. Hostel, DoC end. The recently added timber window which is leaking is white

Figure E3
LEFT MID. Diesel fire equipment on the left.

Figure E4
LEFT BELOW. Water tanks and feed.

Figure E5
BELOW. Connection to space F, with barge boards missing. This will lead to decay.

dept. conserv. hut

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campbell island-METEOROLOGICAL STATION

2E CONDITION

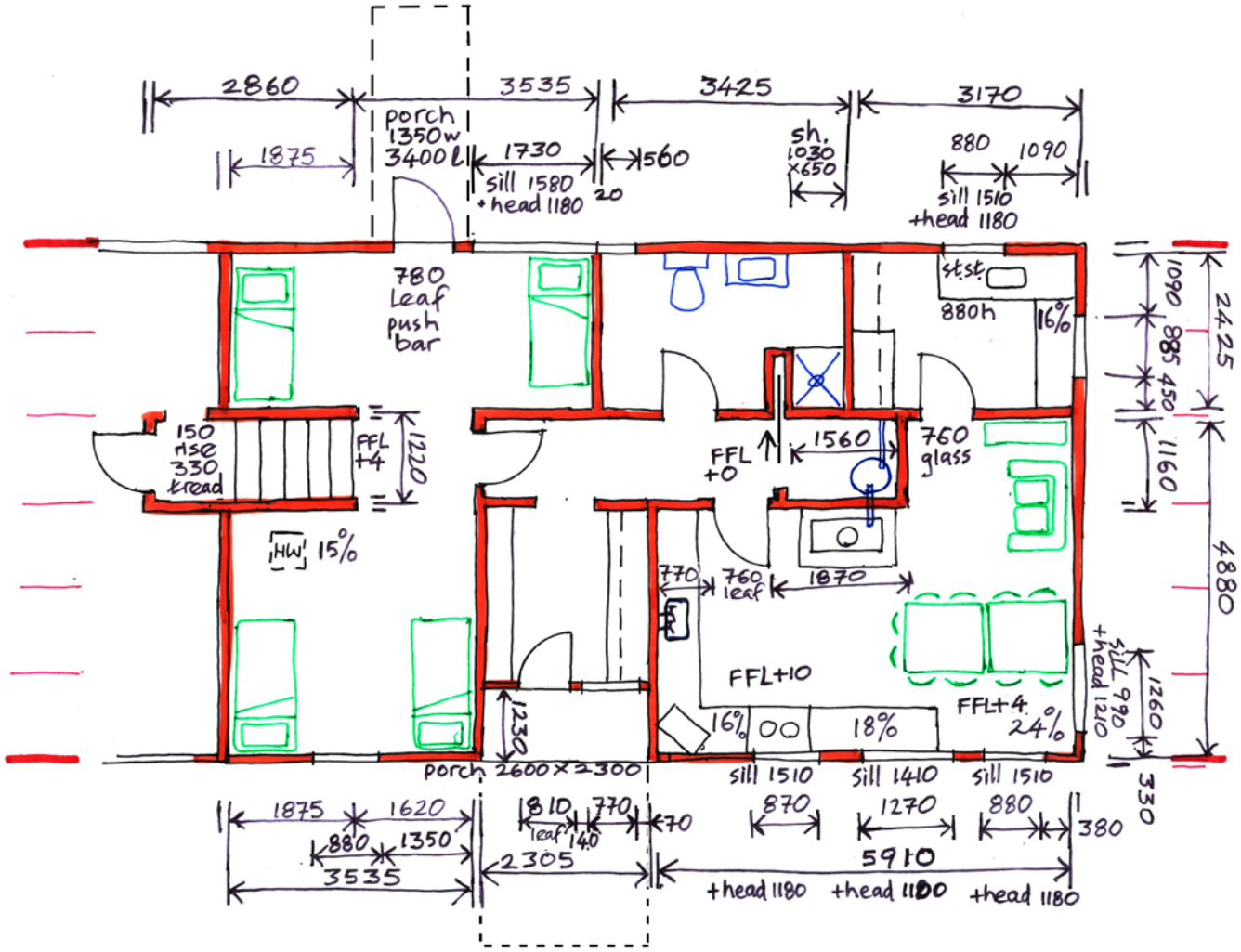


Figure E6
Hostel, DoC end. The leaking window is in the bottom right hand side of the plan, where internal framing moisture content was recorded at 24%. Readings for dry construction in the Campbell Island environment should be 15% to 16%.

Items drawn in green are removable furniture.

Figure E7
LEFT TOP. Foundations of all Hostel Huts, showing requirement for earthquake strengthening in red, where a stub stud is required.

Figure E8
RIGHT TOP. Checks for ferrous material, with an industrial magnet. The product tested was non ferrous and most likely a pure zinc

Figure E9
LEFT. Condition of underside of particle board flooring

Figure E10
LEFT BELOW. Timber window, sill, where leaks will be testing the durability of the framing .

Figure E11
LEFT BELOW. Same window showing the window head

Figure E12
LEFT TOP. Incorrect flashing materials were used when installing the Diesel fire, and this material has already perforated and the durability of the timber truss will need to be checked. Rest of roof generally in acceptable condition.

Figure E13
RIGHT BELOW. Condition of cladding, where the white areas are white rust, or Zinc oxidisation. This is the start of a process that leads to cladding perforation

Figure E14
TOP BELOW. Isolated perforation of Zinc cladding.

Figure E15
BOTTOM BELOW. Isolated perforation of Zinc cladding.

ITEMS IN SECTION **2E** APPLY IN THIS SECTION **2F**

Historic significance	Low or no significance.
Construction	Standard New Zealand wide common construction techniques

Wall condition

Re-cladding needed within one decade. Zinc wall cladding shows extensive areas of white rust. Visual checks showed areas of cladding where failure will occur soon, then decay of structural members inside wall highly probable. Time period of structural failure depends on durability of timber.
No faults or decay found with original aluminium window installation installed decades previously.

Foundation condition

Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years. The particle board flooring has a limited life as it is exposed to intermittent high moisture levels.

Roof condition

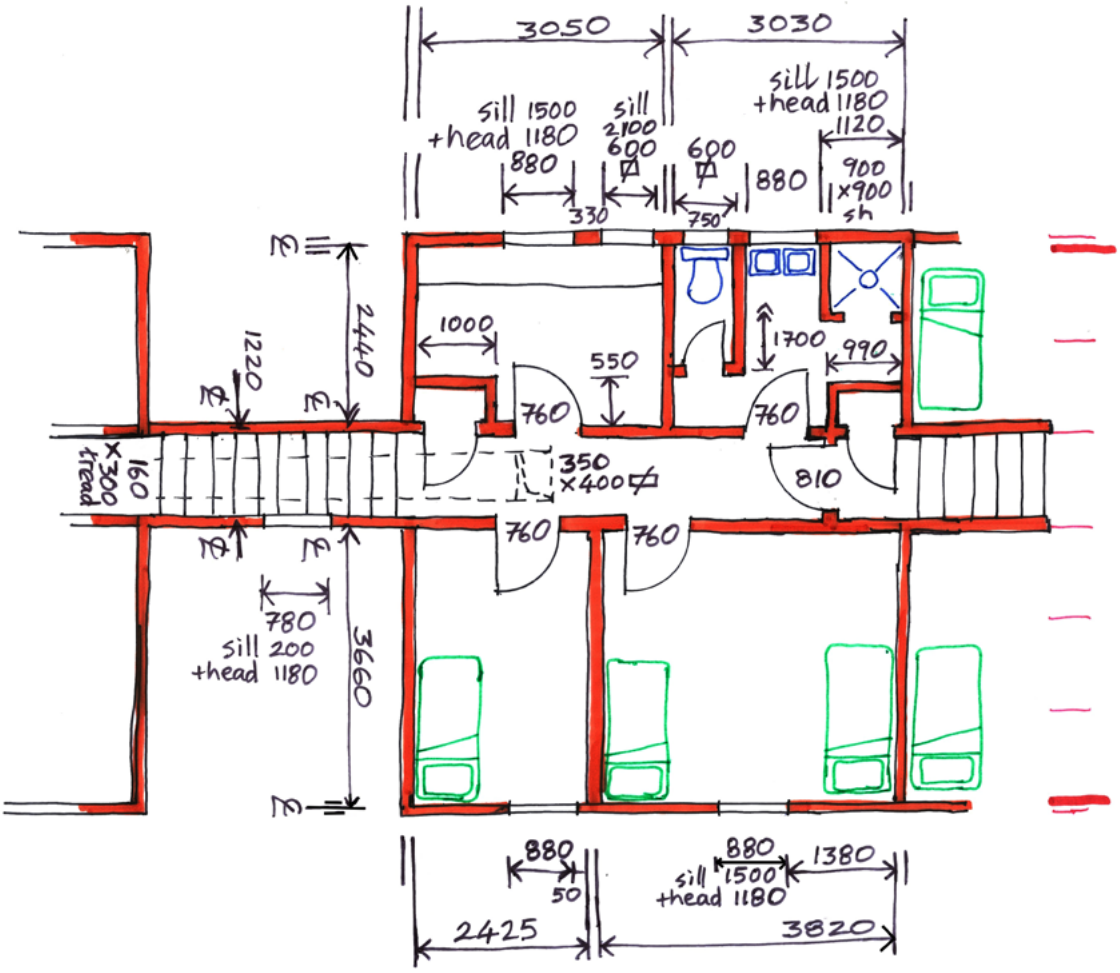
Re-cladding required within one decade at the most.
Minor repairs required, for example around the barge. Roofing already failed in this spot

Use, Feb. 2017	Space required for February 2017

Figure F1
LEFT Department of Conservation sleeping annex. East elevation.

Figure F1
LEFT. Department of Conservation sleeping annex. West elevation.

Figure F2
BELOW. Floor Plan, with items drawn in green being removable furniture.



CONDITION
2F

D.o.C. annex

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campbell island-METEOROLOGICAL STATION

ITEMS IN SECTION **2E** APPLY IN THIS SECTION **2F**

Historic significance	Low or no significance.
Construction	Standard New Zealand wide common construction techniques

Wall condition

Re-cladding needed within a few years, and less than five years. Aluminium wall cladding shows extensive areas of white rust and some areas have already perforated. This cladding where failure will occur soon or has started to occur, will decay the structural members inside. Time period of structural failure depends on durability of timber.

Foundation condition

Assume minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations not checked.

Roof condition

Re-cladding required within one decade at the most.

Use, Feb. 2017 Space partially used in February 2017

Figure G1
ABOVE Hostel sleeping annex. West elevation.

Figure G2
BELOW. Hostel sleeping annex. East elevation.

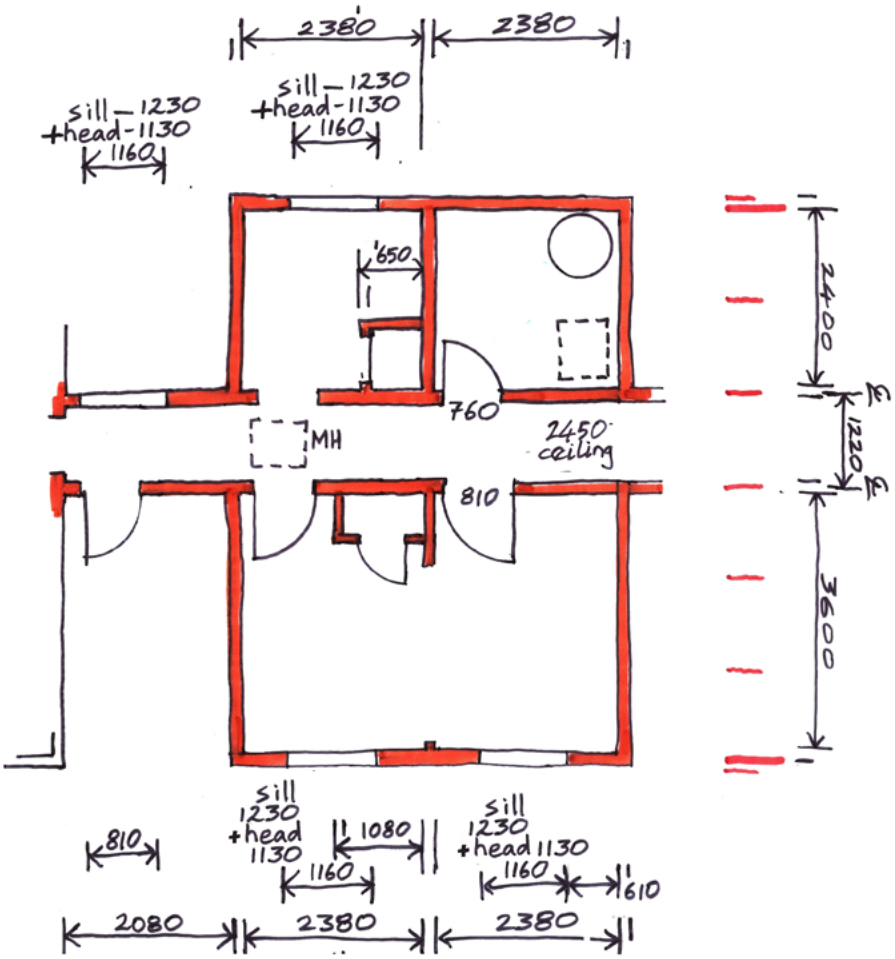

Figure G3
RIGHT -Hostel sleeping annex plan.

Figure G4 ; G5 ; G6
BELOW Examples of corrosion of the inferior grade of aluminium used as a cladding on the annex building. Perforation of the cladding has already occurred.
The grade of aluminium installed on the main hostel has little signs of corrosion or oxidisation, even though it has been exposed in this environment for a decade or longer than the grade of aluminium used on the annex.

Historic significance	High historically significant.
Construction	Techniques historically significant and unique.

Wall condition
Large repairs to the cladding required generally around two decades away.
Minor repairs required within the next year to the plywood copper treated shutters that cover the windows and leach copper over the aluminium below.
Small area picked at random for a spot check and no areas of decay found.

Foundation condition
Foundations could last up to 30 to 50 years.
Additional fixings required as soon as possible for earthquake strengthening between the timber piles and the bearers.

Roof condition
Roof cladding is generally in good order, however, replacement could be required in one to two decades.
Small areas of roofing have already failed and require remedial action next year.
A part of an addition to the original Hostel was installed so that the roof had a negative slope. Here any rain water will not flow off the roof, but collect until the water level brims and overflows .

Use, Feb. 2017 One area of the building was used in a minor way in Feb. 2017

Figure H1
Hostel, east elevation, with plywood shutters installed. The aluminium has a slight green tinge and was the original building installed on white pine piles. The recent lounge addition, installed on treated pine piles, with zinc cladding, is a blue grey on the left.

hostel

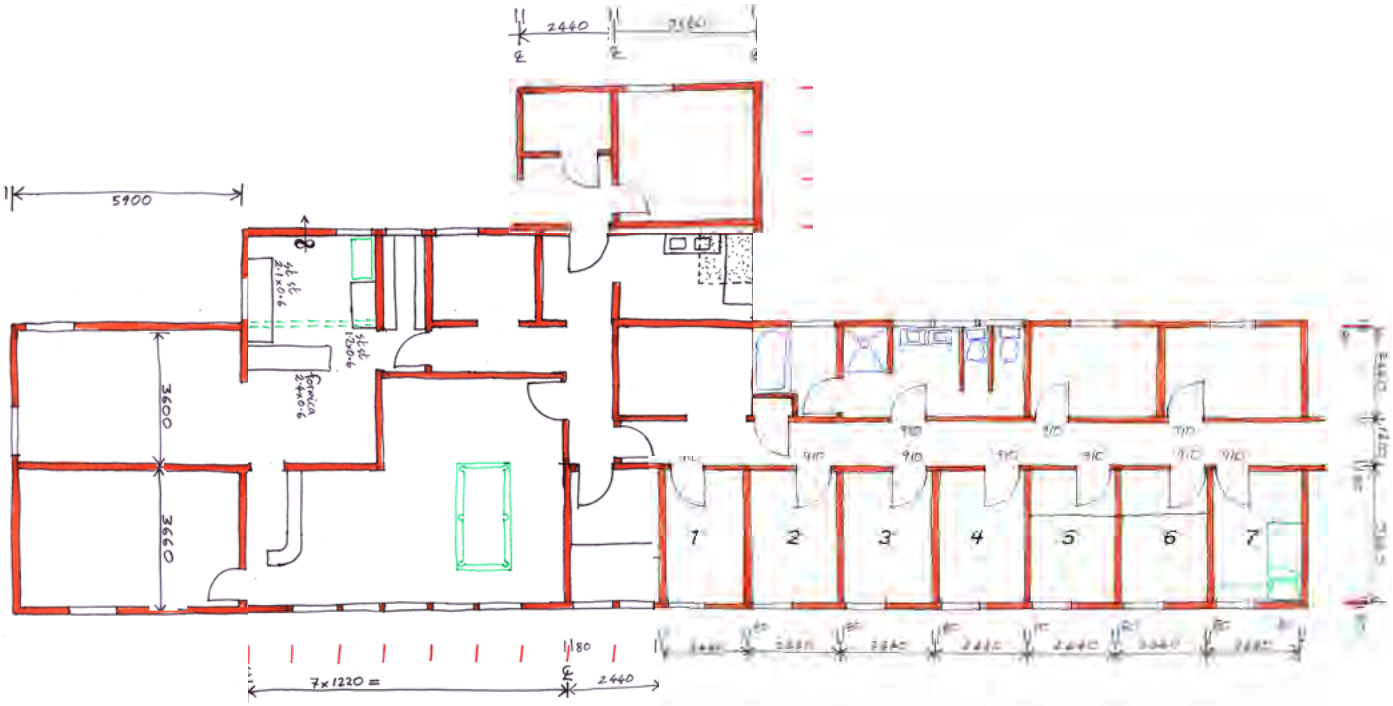

Figure H2
ABOVE The Hostel is set out on a 4 foot (1220mm) grid, and was constructed from transportable flat pack 1220mm wide panels made by the Bristol Aircraft Factory. Each panel has different functions. Some functions of panels include:- Exterior window ; Exterior wall ; Interior wall with roof props ; Interior wall with no roof props ; and an Interior door are common panel types.

On the above plan the bedroom cells are numbered 1 to 7, with bedroom 7 ("PJ") still having the original built in furniture intact. This is of rare significance. Existing furniture is drawn in light green. Any floor platforms in the bedroom, that bring the occupants sight lines above the window sill level, are drawn with a horizontal line across the bedroom or office cell. The line is in the position of the platform.
The recent zinc cladding is on the addition to the left, which is dimensioned 5900mm wide and two rooms deep, each with a dimension of 3600 and 3660mm.

Figure H3
ABOVE The recent zinc clad addition at the south end of the Hostel. The copper treated shutter installed over the window shown in this photo is corroding the zinc.

Figure H4
ABOVE The west elevation of the Hostel, the north end.

Figure H5
LEFT The west elevation of the Hostel looking south to the water tanks and store

hostel

Figure H6 & H7
ABOVE The west elevation of the Hostel, the west wall of the store.

Figure H8
RIGHT The west elevation of the Hostel looking north to the entrance to the store, the sign on the wall says
"BEEMAN COVE HOSTEL"

Figure H9 & H10
BELOW The west elevation of the Hostel looking east to the entrance to the store, the sign on the wall says
"BEEMAN COVE HOSTEL"

Figure H11 & H12
LEFT Recently installed roof patches, using materials with a poor durability.

Figure H13 & H14
LEFT The roof above the kitchen and laundry has a negative slope, and relies on wind and evaporation to clear water . From the original plans, the elevation drawings could indicate that the roof was originally clad with a membrane, as the barge boards are horizontal. This membrane roof cladding is not noted. The recent zinc roof cladding will suffice in the short term but does not meet any building standard or manufacturer's recommendations.

Figure H15
LEFT The zinc on the extension has started to corrode, white rust, or oxidisation, is prevalent at the base of the recent zinc clad Hostel extension.

Figure H16
LEFT Loose number 8 wire connections, between the floor bearers and piles, were shown to provide little resistance to damage in an earthquake.

Figure J1
ABOVE Growth in and extending out of a water tank.

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Condition	Minor repairs only required.
Foundation condition	Not requested and not checked
Roof - Tank condition	Excellent, copper tanks are very durable.
Use, Feb. 2017	To be confirmed, assume use during Feb. 2017.

Figure J2 & J3
ABOVE Extent of water tanks.

Figure J4
RIGHT Detail of water pipes

water tanks

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campbell island-METEOROLOGICAL STATION .

CONDITION 2J

Figure J5 & J6
ABOVE Panorama of water tanks.

water tanks

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campbell island-METEOROLOGICAL STATION

Historic significance	Low or no significance.
Construction	Standard NZ wide common construction.

Wall condition
Re-cladding on the walls (one) where the bottom edge does not cover the bottom plate will be required in about five years. Structural decay is highly probable. The rest of the cladding should last around one or two decades .

Foundation condition
Minor repairs of additional fixings required as soon as possible for earth-quake strengthening. Generally the foundations could last up to 30 to 50 years. However the cladding does not protect the floor edges, and there were very high readings taken in the particle board flooring. As such, the flooring inside would most likely be the first item to completely deteriorate

Roof condition
Roof replacement would be required up to two decades away.

Use, Feb. 2017	No use during February 2017.

Figure J1
BELOW The east elevation of the Cool Store.

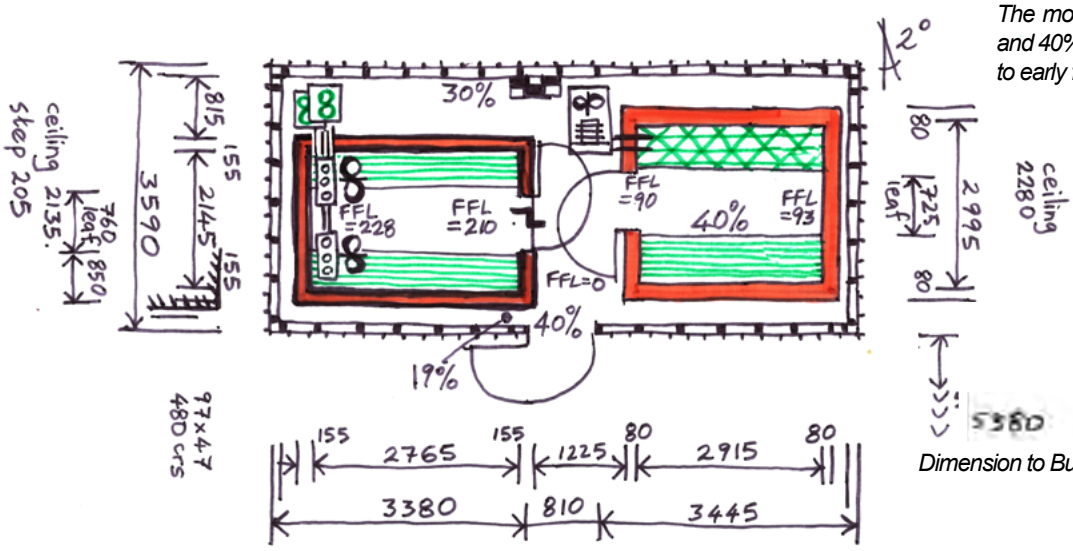

Figure J2
The dimensioned plan of the cool store. The moisture readings are high, at 30% and 40%, and these percentages will lead to early floor failure.

Dimension to Bulk Store (N)

Figure J3
The north elevation of the Cool Store. Compare the condition of the Marsden matting as Michael Kelly, in his historic report, August 2017, took a photo from a similar angle.

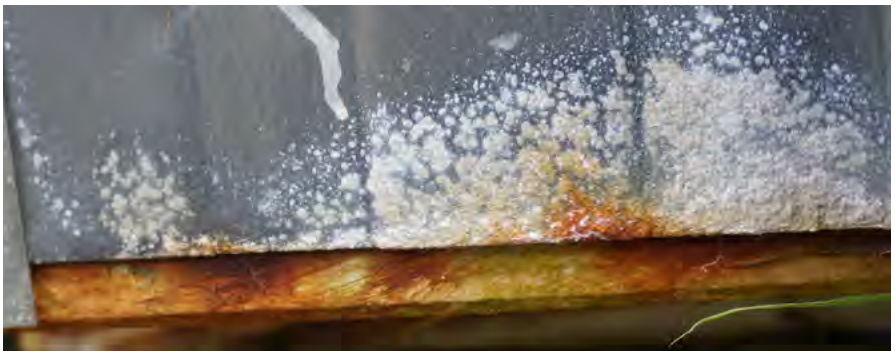

Figure J4
The bottom edge of the cladding of the Cool Store. The bottom plate is visible. Water runs down the cladding, and then over the bottom plate, where the timber will absorb this moisture. This is transferred to the floor where high moisture levels are recorded. This will lead to early floor failure.

Figure L1
ABOVE The Meat hanging and butchery hanging room. The roof and walls are in very poor condition.

Figure L2 ; L3 ; L4
The east elevation of the Carpentry store on the far right, the vegetable store labelled "DOC" in the centre, and the building equipment and timber stores on the far left.

Historic significance	High historically significant.
Construction	Standard New Zealand wide common construction techniques

Wall condition
Minor repairs required within the next two years, then large repairs needed within a few years.

Foundation condition
Minor repairs of additional fixings required as soon as possible for earthquake strengthening. Foundations could last up to 30 to 50 years

Roof condition
Roof cladding has punctured around the edges and replacement required within one decade at the most.

Use, Feb. 2017	Used during February 2017.

CONDITION 2L

carpentry, vegetable & meat store

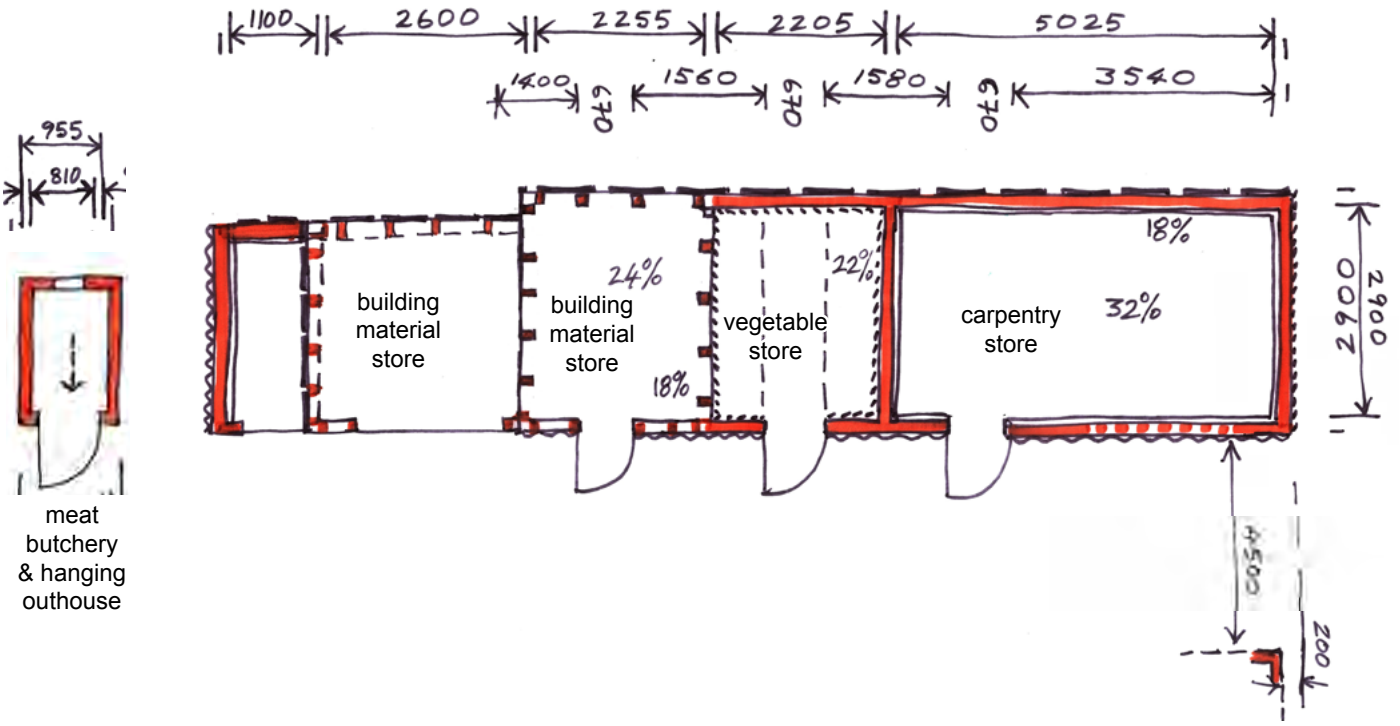

Figure L5
ABOVE The Meat hanging or butchery room is on the far left. The plan indicates the wall materials, with a long dash being a possible asbestos based material, the wavy line is vertical corrugated steel, and the short dots are plywood. A dashed red line indicates a possible window. The percentages indicate moisture content; any figure that is over 20%; will lead to decay. The rate of this decay depends on the durability of the timber

Figure L6
LEFT The condition of the roof on the meat outhouse

carpentry, vegetable & meat store

Figure L7 ; L8 ;
ABOVE. Simple house keeping measures, which involves the removal of moss and forest litter from the roof, would allow the roofing to dry and would remarkably extend the durability of the roofing.

Figure L9 ; L10
NEAR RIGHT. The earth bank has subsided and is now hard against the meat outhouse walls and up over the roof.
FAR RIGHT. Condition of the carpentry walls , with disconnected down pipe. This together with the forest litter on the roof, has lead to high moisture readings.

Figure L11
BELOW Moisture readings in the meat outhouse, showing complete water saturation at 99.9% out of 100%. Readings inside a building should be between 30% & 40% typically.

carpentry, meat & vegetable store

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campbell island-METEOROLOGICAL STATION .

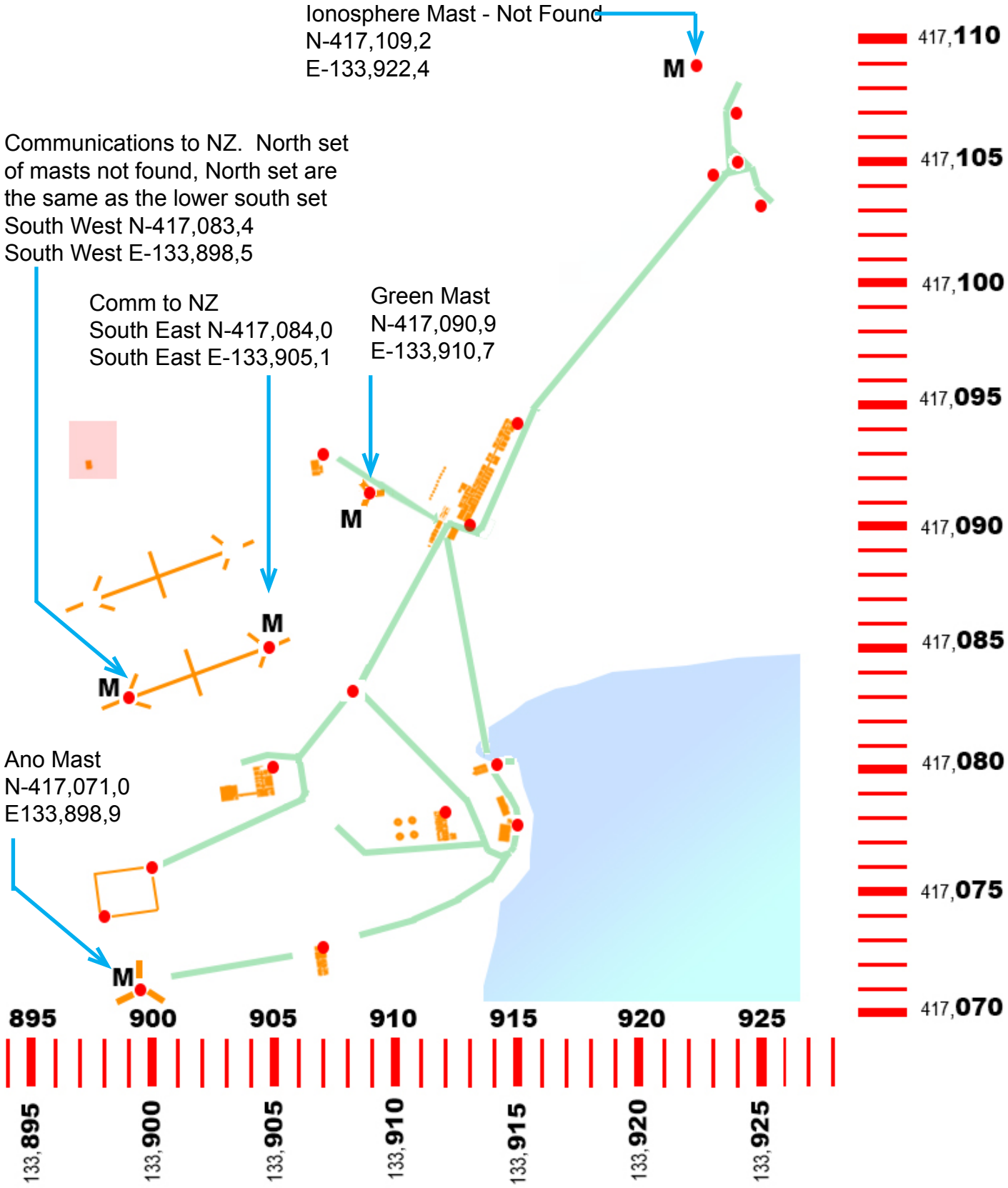
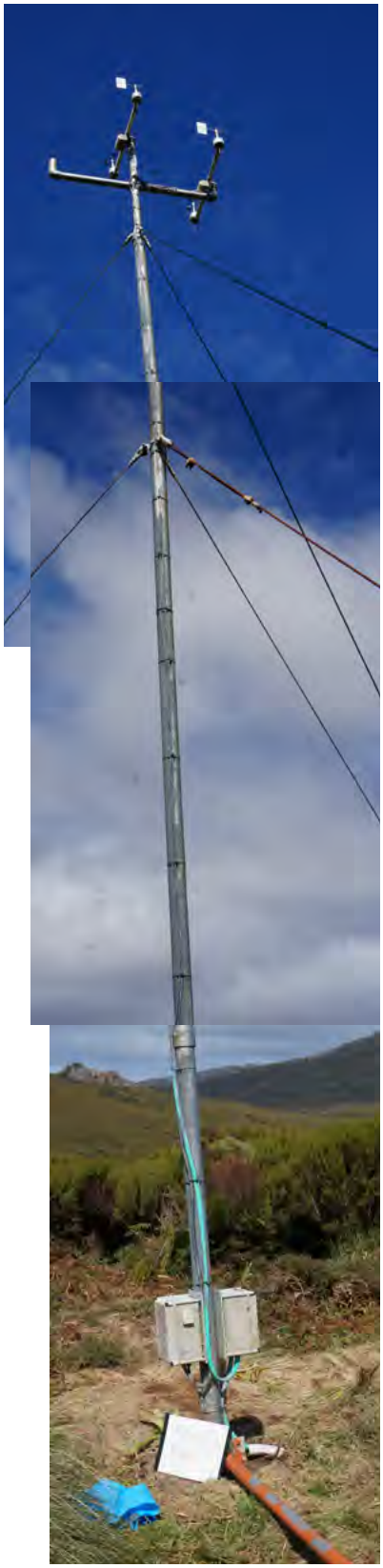


Figure M1
ABOVE. Plan of Masts, with Eastings and Northings, to DoC NZTM , not Campbell Island system, refer page 20

masts

Figure M2
RIGHT. Green Aerial, on the track to the Aurora Hut

Figure M3
FAR RIGHT. Anemometer Aerial, near the climatology enclosure. Automatic equipment transmittal can be seen at the base of the aerial.



masts

Figure M4
RIGHT. Aerial Mast to NZ, this mast was measured and photographed.

Figure M5
BELOW Aerial closest to Technical building (background) was surveyed, as tussock below aerial could be negotiated. Concrete block at base (red arrow) is the South East mast, south west guy block. The remaining platform is the all sky camera.

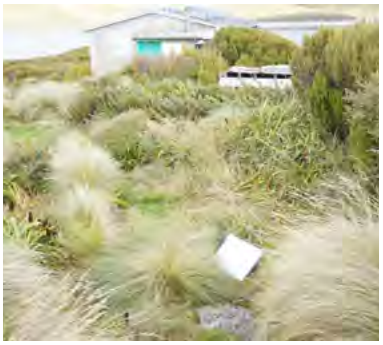


Figure M5
LEFT Second mast not found, as bush was too thick and high. Photo below.

Figure M6
BELOW. Height of bush in area of second mast

masts

Figure M7
CLOSE RIGHT. Aerial Mast to NZ, transmitter feed 150 Parallel Flange Channel (PFC) feed at centre of aerial.

Figure M8
FAR TOP RIGHT Aerial tie down block at each mast end.

Figure M9
FAR MIDDLE RIGHT Aerial mast socket, about 50mm diameter.

Figure M10
FAR BOTTOM RIGHT Guy rod block, at 120 degree intervals.

Figure M11
LEFT. All sky camera building, the walls have been demolished and the foundations only remain. The area for the first aerial to NZ is in the background.

Figure M8
BELOW. The chook shed slab remains. This is below the south east corner of the Technical Building.

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Large repairs needed within a few years. Test completed inside the wall showed cladding was dry and stable.
Foundation condition	Foundations could last up to 30 to 50 years. Foundation bracing missing. Decks around the building are dangerous. Minor repairs of additional fixings required as soon as possible for earthquake strengthening.
Roof condition	Roof cladding punctured in a few places & repairs required within a few years.
Use, Feb. 2017	No use during February 2017, except for the winch

Figure N1
BELOW East elevation, showing cantilevered piles, and little diagonal bracing. The winch to the jetty is on the left. This elevation has the original cladding, however rust stains and perforations exist at the base.

CONDITION 2N

bulk food store

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campbell island-METEOROLOGICAL STATION

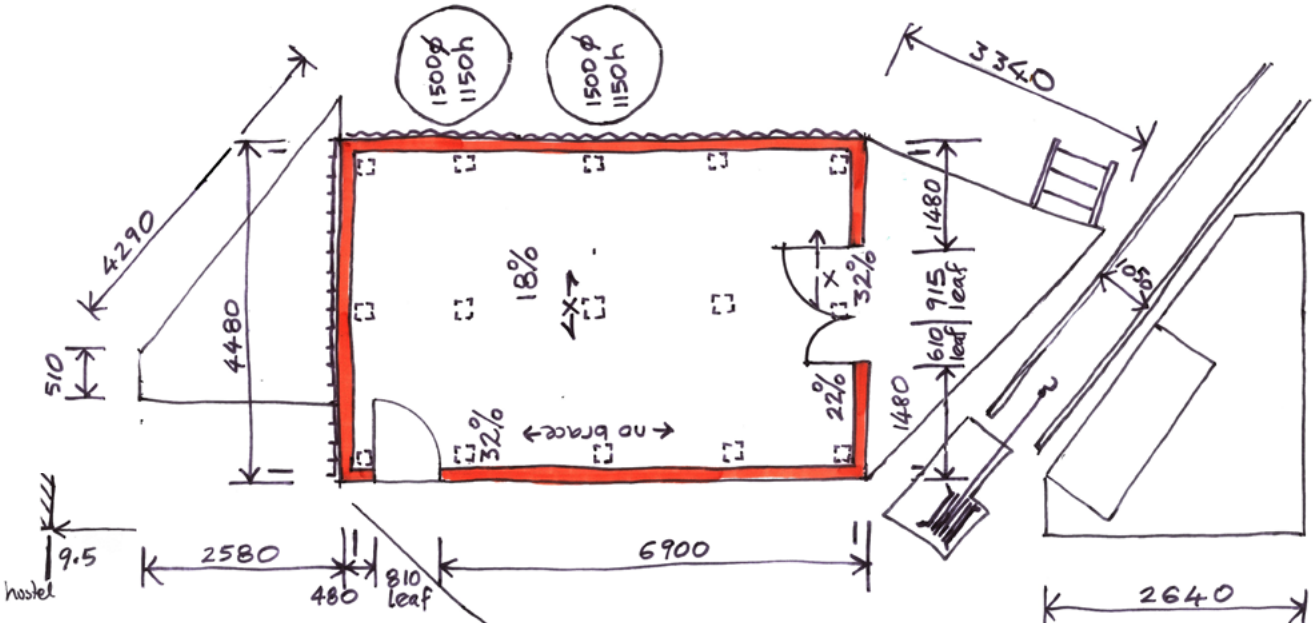

Figure N2
ABOVE Plan, with winch to the jetty on the left.

Figure N3
BELOW Elevation to the west, from the main walkway. The cladding to this elevation has been replaced,

bulk food store

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campbell island-METEOROLOGICAL STATION

2N CONDITION

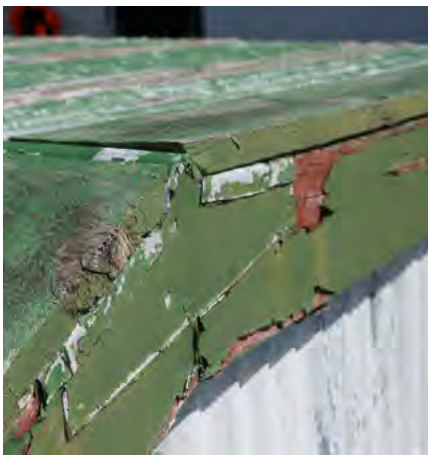
Figure N4
LEFT North elevation, with original cladding.

Figure N5
LEFT Elevation to the south. The cladding to this elevation has been replaced.

Figure N6
BOTTOM LEFT Roof condition showing perforation.

Figure N7
BOTTOM MIDDLE Patches around the ridge of the Bulk store.

Figure N8
BOTTOM RIGHT Rust starting in areas of the original cladding not replaced.



bulk food store

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campbell island-METEOROLOGICAL STATION

Figure o1
LEFT Photo of the trolley track from below.

trolley track

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campbell island-METEOROLOGICAL STATION

Figure o2
ABOVE LEFT First spare trolley in the bulk store.

Figure o3
ABOVE MIDDLE Second spare trolley in the bulk store. The trolley used in February 2017 was not photographed.

Figure o4
ABOVE RIGHT Trolley track cross over at the boat ramp. The track to the left heads up to the winch, over the sea as per figure o1.

Figure o5
LEFT Photo of the trolley track winch engine and winch, being run by Rossco, Met service.

Historic significance Construction	Marsden Matting, high significance. Techniques historically significant and unique.
Foundation condition	Slowly rusting away
Use, Feb. 2017	Used as a path stabiliser, Feb. 2017.

Figure N4
ABOVE Typical path condition

Figure N5
LEFT Detail of Marsden matting, one of the few areas where the matting is exposed. There has been a complete change in undergrowth around the matting, refer Michael Kelly's report.

Historic significance	Average significance.
Construction	Standard New Zealand wide common construction techniques.
Wall condition	Near to demolished by neglect.
Foundation condition	Minor repairs & additional fixings required.
Roof condition	A large portion of the timber roof structure has been neglected and is due for replacement.
Use, Feb. 2017	Space or structure used Feb. 2017

Figure Q1
BELOW Entrance to the jetty boat shed. This structure is close to the boat landing ramp and as such is useful in boat transfers.

CONDITION 2Q

jetty boat shed

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campbell island-METEOROLOGICAL STATION

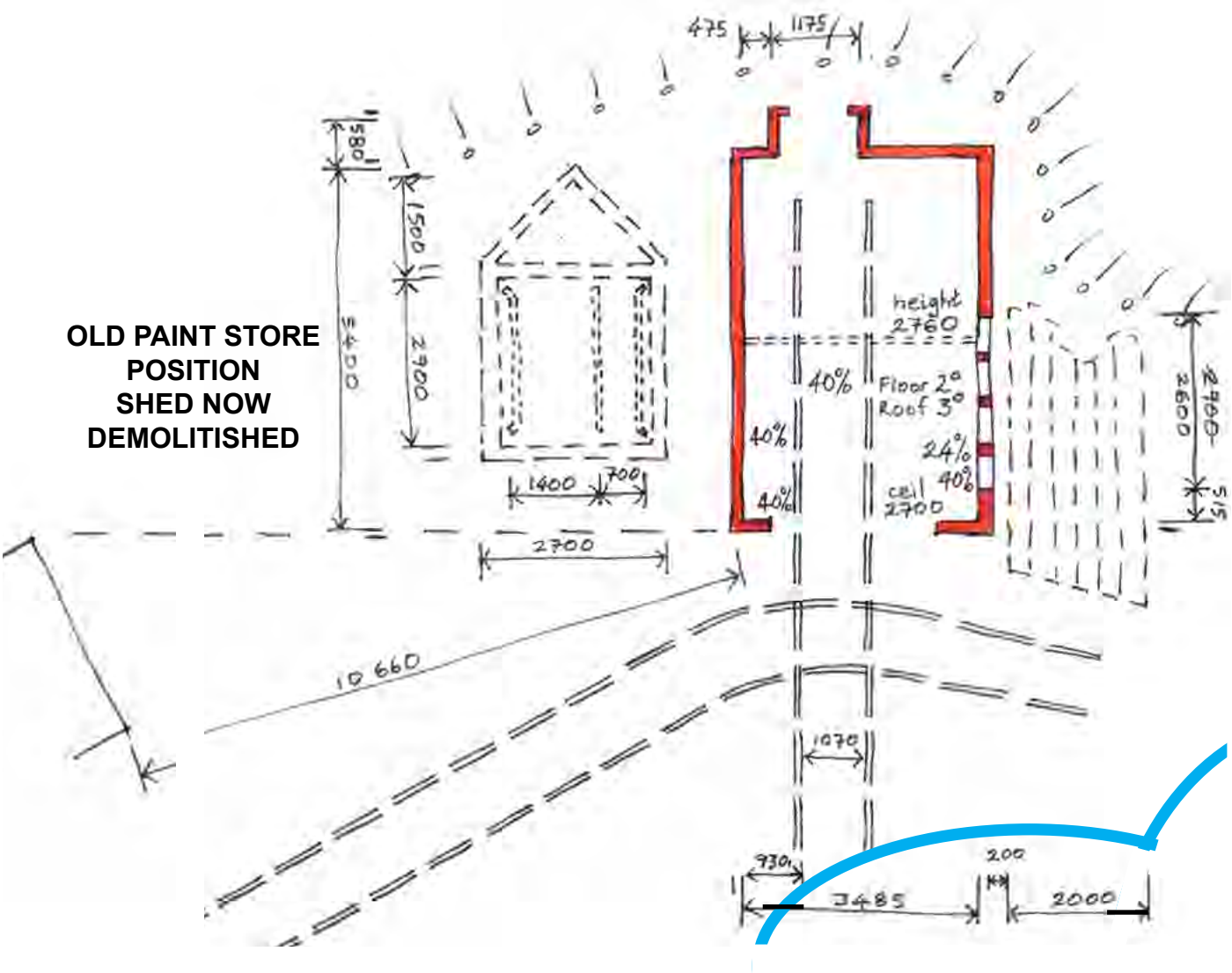

Figure Q2
ABOVE Plan of Jetty Boat Shed, with the approximate mean high water springs shown in blue. Any timber readings of 40% indicate complete water saturation of the timber, and decay is inevitable, depending on the durability of the timber purlins.

Figure Q3
LEFT Detail of roof. Dark stains on the roof members indicate water damage. The roof cladding has been replaced, however the window in the right corner has no glass.

jetty boat shed

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campbell island-METEOROLOGICAL STATION

2Q CONDITION

Figure Q4
RIGHT TOP North Elevation, with DoC ranger operations Kathryn Pemberton holding the measuring staff. The far left pane of glass is missing, and the bank to the right has slipped and is resting against the right (west) wall. The wall still has the original corrugated cladding.

Figure Q5
RIGHT MIDDLE South wall, showing original cladding, and more recently replaced roof. The west wall (left) where the bank has slipped now has vegetation growing from the slipped soil, and over the roof. Encouraging roof structural decay.

Figure Q6
RIGHT LOWER MIDDLE South wall, with Diesel hose, for filling the land based tanks from tanker ships. The railway and winch is to the right, with a small corner of the Hostel visible to the far right.

Figure Q6
RIGHT BOTTOM Inside, with the earth against the west wall, visible through the far door, where I assume the door has decayed.

jetty boat shed

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campbell island-METEOROLOGICAL STATION .

CONDITION 2Q

Historic significance	High historic significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required. The galva nised sheet has been installed directly over all the windows and doors, and this will lead to excessive sweating of the wall, doors, and windows. Then decay.
Foundation condition	Minor maintenance checks to ensure that the ground is kept 200mm below the low-est weather board. Replace the lowest flashing at the base of the weatherboards.
Roof condition	Roof cladding rusting and needs replace-ment in less than one decade.
Use, Feb. 2017	Used during February 2017.

Figure R1
BELOW East Elevation, the Spirits Store, where spirits refers to motor spirits, pet-rol, diesel, paint thinners, and paint. The inside is completely clad in galvanised steel sheet, taken across all the windows. There is no ventilation between the galv sheet and the wall

formerly Mechanical Shed

spirit / paint store

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campbell island-METEOROLOGICAL STATION

2R CONDITION

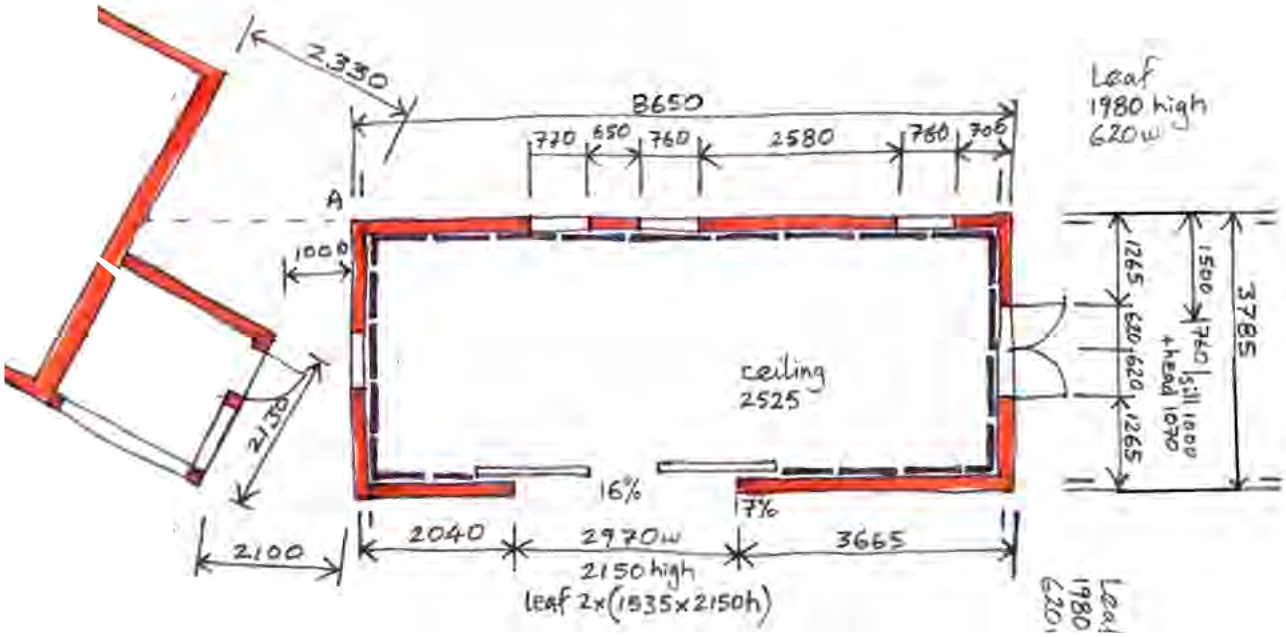

Figure R2
TOP Floor Plan

Figure R3
RIGHT MIDDLE North wall, with decaying peat partially removed from the base.

Figure R4
RIGHT LOWER South wall, with interior cladding clad directly behind the windows.

formerly Mechanical Shed
spirit / paint store

Figure R5
LEFT TOP Wall closest to the bank, moss and mould will speed up decay and needs to be removed.

Figure R6
LEFT MIDDLE Concrete foundations, with evidence of creepers entering the wall through the bottom plate.

Figure R7
LEFT LOWER MIDDLE The corner of the doors, where the door style meets the bottom rail. This, as well as other style / bottom rails, are rotten.

Figure R8
LEFT LOWEST Roof where edge has lost the protective coating, and the sub-strate is rusting .

formerly Mechanical Shed

spirit / paint store

Historic significance	High historic significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required. A galvanised flashing at the base of the wall has rusted away and needs replacing before water decays the structure behind. The rest of the wall is in good condition.
Foundation condition	Minor maintenance checks to ensure that the ground is kept 200mm below the lowest weather board.
Roof condition	Roof cladding rusting and needs replacement in less than one decade.
Use, Feb. 2017	Used during February 2017, mainly for rubbish storage.

Figure S1
BELOW East elevation of Jetty Store with winch alcove, with window openings removed and on the ground leaning against the Spirits / Paint store.

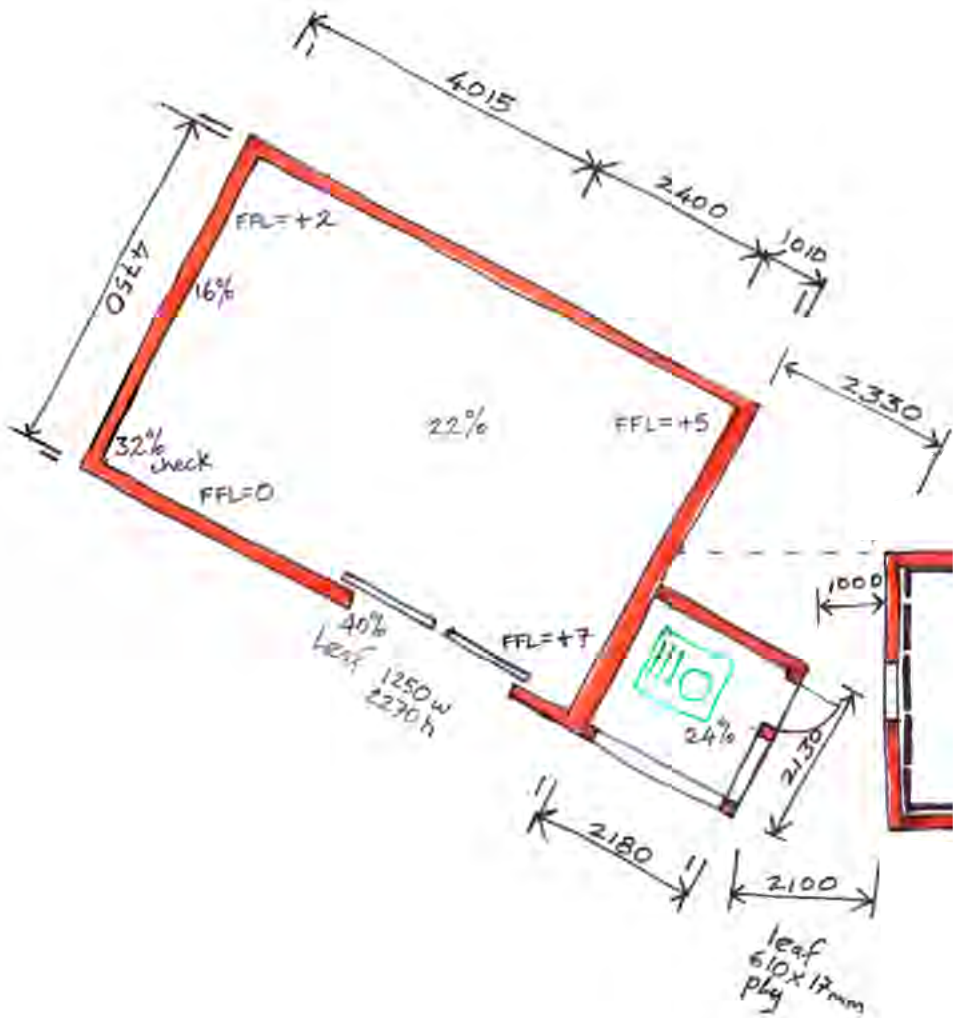

Figure S2
LEFT TOP Jetty Store, Floor Plan

Figure S3
LEFT BOTTOM Winch in winch alcove.

jetty store

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campbell island-METEOROLOGICAL STATION

Figure S4
LEFT TOP South wall of the Jetty Store,

Figure S5
RIGHT TOP North wall of winch alcove.

Figure S6
LEFT MIDDLE North wall, behind the winch alcove.

Figure S7
RIGHT MIDDLE West wall, next to the bank.

Figure S8
RIGHT MIDDLE Accumulated rubbish in store room.

Figure S9
RIGHT BOTTOM Rusting strap on door. The door styles / bottom rails are also rotten

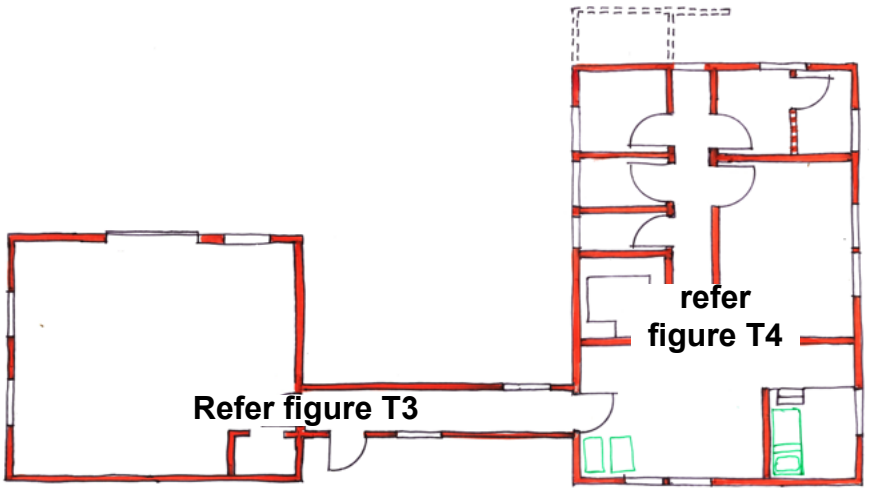
Historic significance	High historic significance.
Construction	Techniques historically significant and unique.
Wall condition	Minor repairs only required where copper treated glazing panels were added over the glass / windows. If these panels had not been added, then there would be less maintenance and the aluminium panels on the facade would last many years longer. Some wall panels have high internal moisture readings and decay is expected.
Foundation condition	Foundations could last up to 30 to 50 years. Minor repairs of additional fixings required as soon as possible for earthquake strengthening.
Roof condition	Minor repairs required, roof replacement within one decade as black membrane protecting the laps of the panel roof system is debatable
Use, Feb. 2017	High use all year around in one corner of the main room, where permanent weather forecasting equipment has been set up. Rest of the spaces had little or no use during February 2017.

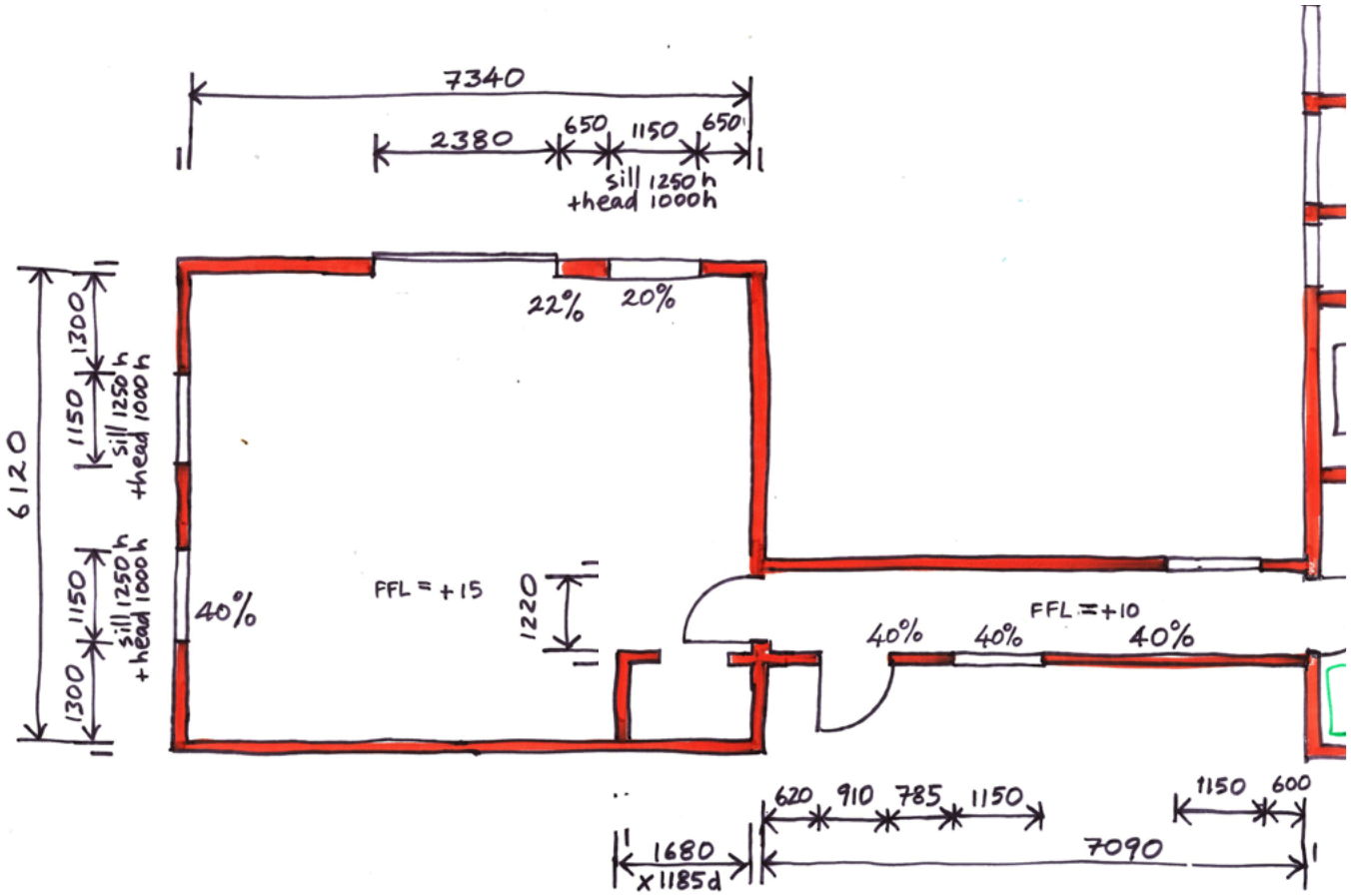
Figure T1
BELOW East elevation of the technical building, with solar panels on the roof that supply power to the permanent climatic equipment in the corner of the room.

technical building

Figure T2
RIGHT Full plan of the Technical Building, with detailed plans below.

Figure T3
BELOW The recent extension of the Technical Building, a garage door 2380mm wide, and corridor to the Technical Building. Moisture levels of 40% are of concern and show complete water saturation inside the wall. Moisture readings in the Campbell Island climate should be around 15%





technical building

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campbell island-METEOROLOGICAL STATION

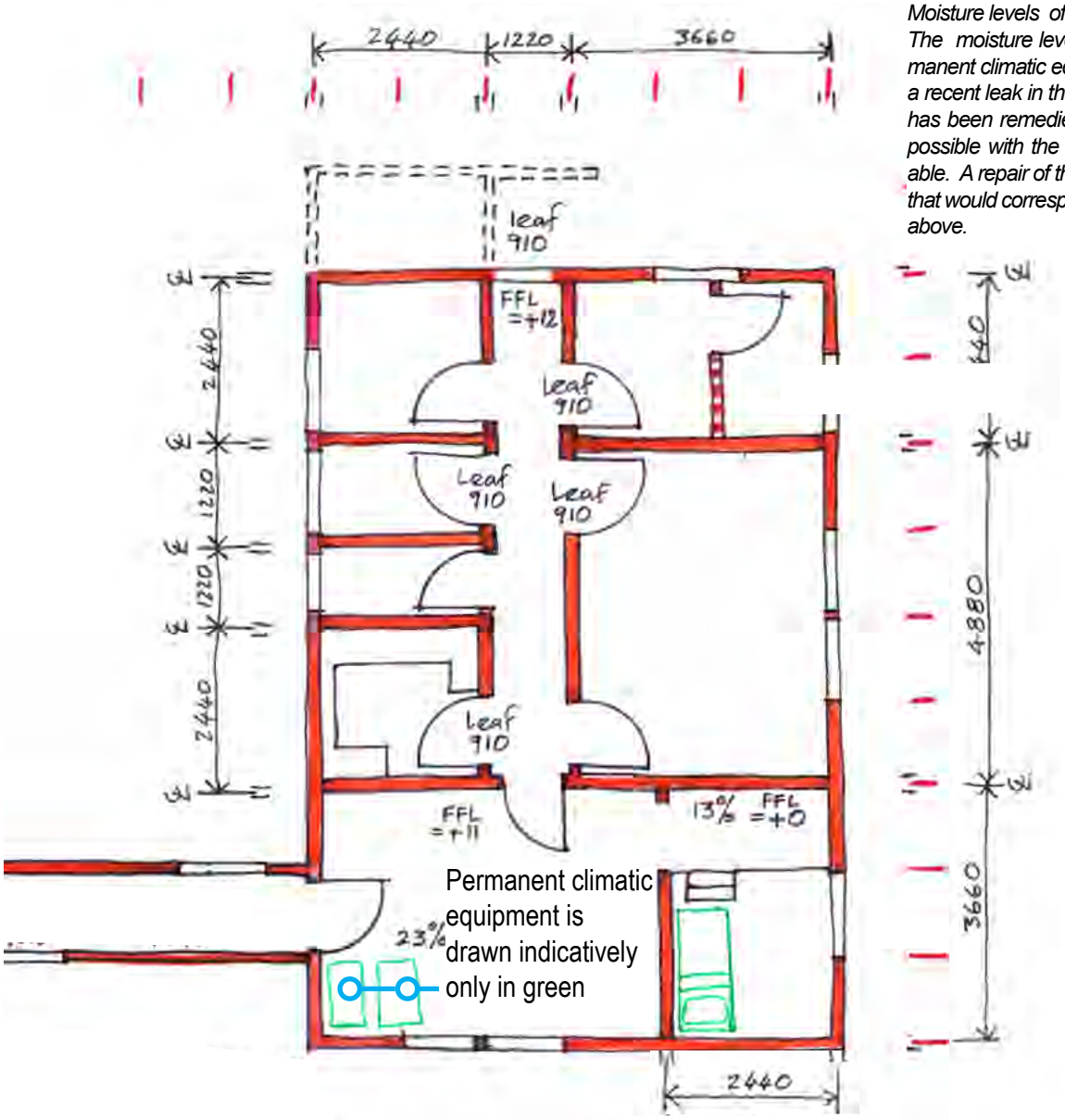

Figure T4
BELOW The original Technical Building. Moisture levels of 13% are excellent . The moisture level of 23% near the permanent climatic equipment is indicative of a recent leak in the roof above. This leak has been remedied to the best standard possible with the ad hoc materials available. A repair of this sort has a limited life, that would correspond to the life of the roof above.

Figure T5
LEFT The permanent climatic equipment is circled in red, generally on the old desks. The moisture reading, 23%, was completed in front of the battery pack, under an existing roof leak partially fixed. This reading indicates inevitable decay, with the rate of decay dependent on the durability of the timber. The flooring would have the least durability.

Figure T6 , T7 , T8
ABOVE The south elevation of the Technical Building.
The foundation timber sample was taken where the yellow circle is on fig T7. This was taken to prove equivalence to other timber samples taken on other historic buildings, to estimate durability of Silver Pine. A note in the 1950's in the George Poppleton's book on "Campbell Island 1955-56 - 1958 - 60" was that this timber in the 1950's was a 'supply problem'

Figure T9
FAR RIGHT The Silver Pine pile. The same species was used on the Ormondville Railway Station. At Ormondville this species of timber pile lasted approximately 90 years in a soft peat . As is typical, decay at Ormondville was most aggressive on the aerobic / anaerobic zone, between dry and wet peat. This is seen on this pile where the ground level has eroded away over time.

Figure T10
ABOVE RIGHT Microscopic view of the timber species. Both Ormondville and Campbell Island piles have similar cell structure. Also the specific gravity of both timbers was measured by coating samples in water and measuring in a test tube. Both are above a specific gravity of 1, an unusual non typical reading.

Figure T11
RIGHT The north elevation of the Technical Building, with the garage door (2380mm wide) in green.
The photo to the left was not taken owing to a particularly aggressive seal (Sammy) taking up residence in the scrub to the left of where I was standing when taking this photo.

technical building

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campbell island-METEOROLOGICAL STATION .

Figure T12
ABOVE The original aluminium clad roof, with a membrane over, an economical possible solution to remedy the roof leaks. This membrane is now ending its effective life.

Figure T13
ABOVE RIGHT Solar panels powering the climatic equipment. Roof membrane degradation shown with silver patches showing through the black membrane.

Figure T14
ABOVE RIGHT The original aluminium roof panels viewed a missing ceiling panel.

Figure T13
ABOVE LEFT Recent water damage from above the bed, in an area of a previously leaking roof. This leak is from the same flashing as was fixed above the permanent climatic equipment.

Figure U1
ABOVE The Jetty, just before being roped off .

Figure U2
RIGHT The Jetty derrick

Figure U3
LEFT Extent of timbers removed from the jetty

Figure U4
BELOW Detail of the Jetty derrick

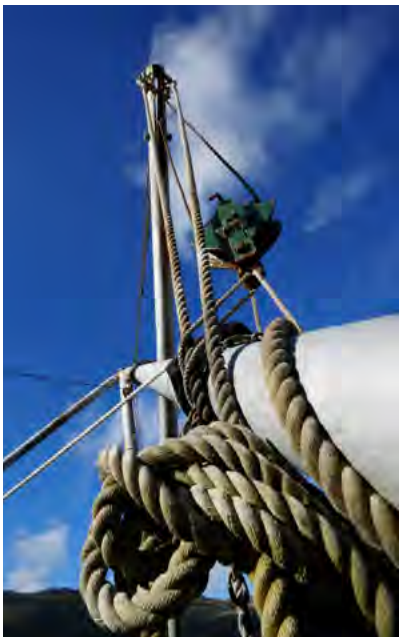


Figure U5 , U6
ABOVE Extent of timbers removed from the jetty from the winch room, (S)

Figure U4
RIGHT The HMNZS Otago viewed through the derrick

Historic significance	Highest category, historically significant.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Near to demolished by neglect, structural timbers are mostly sound, where test drilling was possible .
Foundation condition	Near to demolished by neglect, sunk 300mm.
Roof condition	Near to demolished by neglect
Use, Feb. 2017	Use impossible, close to demolished.

Figure V1 , V2 , V3 , V4
CLOCKWISE FROM TOP LEFT The east, north, south, and west elevations of the Tucker Hut

Figure V5
RIGHT The plan of the Tucker Hut. the 300 mm dimension is the amount that the floor is out of level. The 40% figure indicates complete saturation of all timbers.

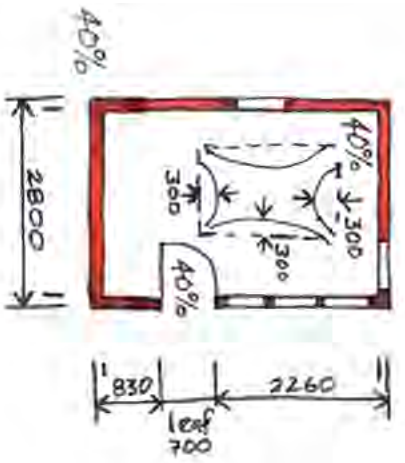


Figure V6
FAR RIGHT The author, Paul Cummack, completing sample test drills of the structural timber studs. The timber here was sound.

Figure V7
BELOW The ceiling has collapsed onto the furniture below. Holes in the roof are visible as light patches. The window is missing. The towel in the far left bottom corner has remained relatively clean with all the internal moisture.

Figure V8
LEFT Condition of the edge of the roofing, showing extensive perforation.

Figure V6
LEFT Record of the size and profile of the weatherboards.

Historic significance	Low significance.
Construction	Standard New Zealand wide common construction techniques
Wall condition	Minor repairs only required.
Foundation condition	Foundations could last up to 30 to 50 years
Roof condition	Minor repairs required, however roof replacement is due within one decade, as areas rusting.
Use, Feb. 2017	No use during February 2017.

Figure W1
BELOW South elevation of the generator garage.

CONDITION 2W

generator garage

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION

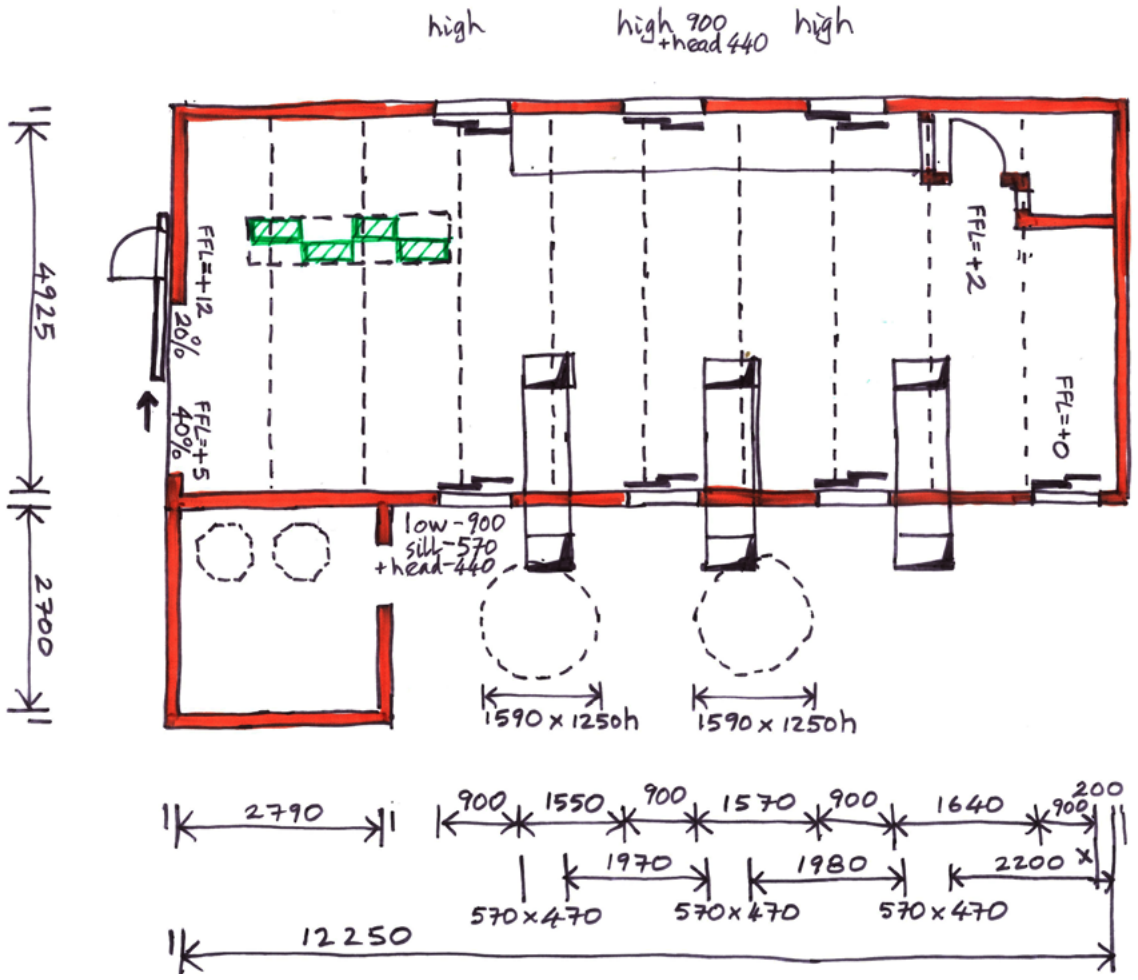


Figure W2
ABOVE Floor plan of generator garage.

Figure W3
LEFT North elevation of the generator garage

generator garage

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2W CONDITION

Figure W4
FAR TOP Generator garage, east elevation, the water tanks at the front have been given to the HMNZS Otago

Figure W5
ABOVE West elevation.

Figure W6
RIGHT Rust developing at the edge of the roofing.

generator garage

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION .

Figure X1
FAR TOP South elevation of the water tanks.

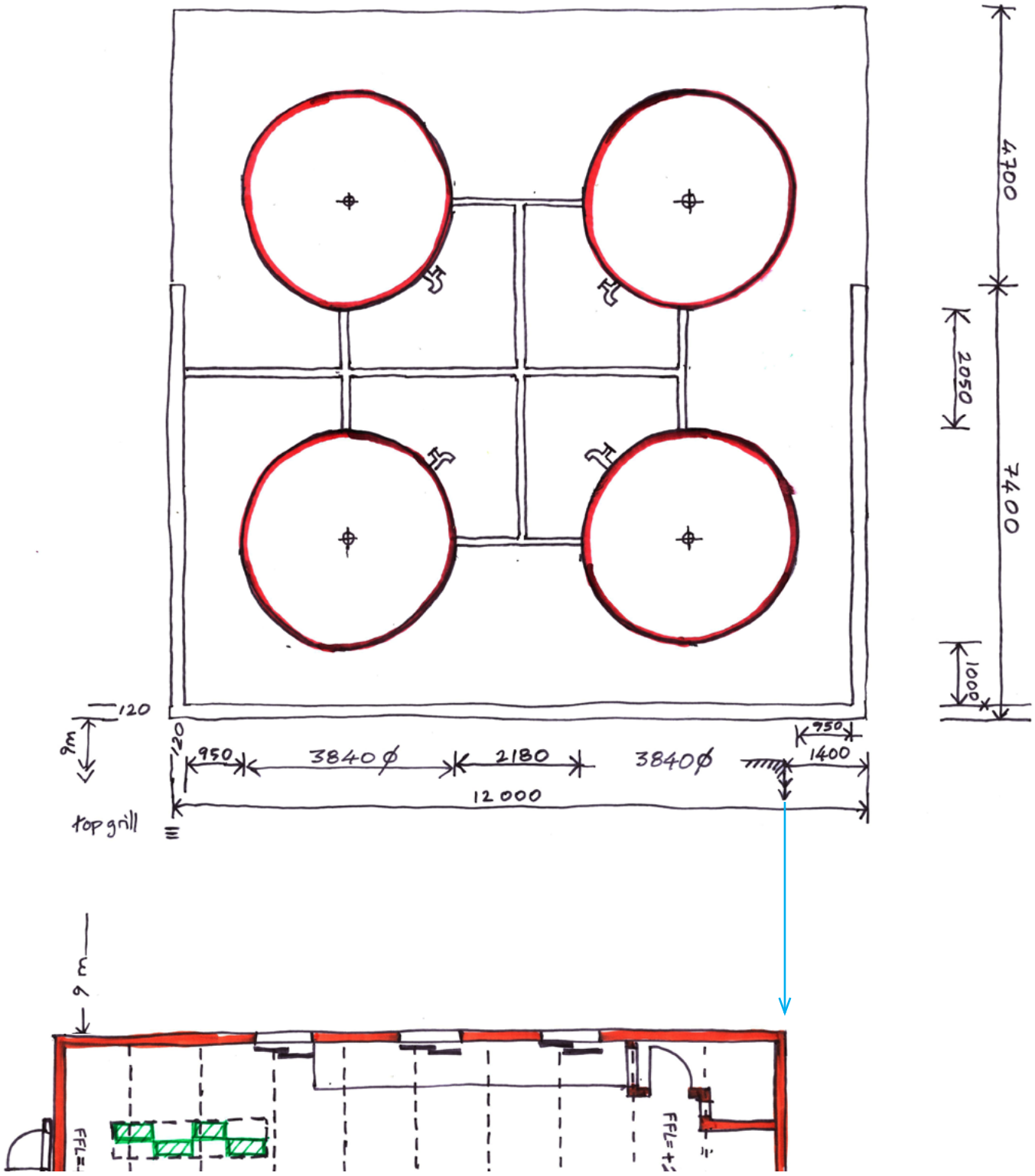
Figure X2
ABOVE West elevation.

fuel tanks

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2X CONDITION



CONDITION
2X

fuel tanks

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION

Historic significance	High historic significance.
Construction techniques	Standard New Zealand wide common construction
Wall condition	Near to demolished by neglect. Large repairs were completed less than a decade ago by over-cladding with plastic sheeting. This sheet is now extensively chipped, brittle, and no longer provides protection.
Foundation condition	Foundations could last up to 30 to 50 years Minor repairs of additional fixings required.
Roof condition	Not possible to view.
Use, Feb. 2017	No use during Feb. 2017, asbestos inside.

Figure Y1
BELOW TOP Photo of sign on the hydrogen building.

Figure Y2
BELOW MIDDLE Photo of sign on the hydrogen building, taken with a red filter, so that the letters can be read.

DANGER
HYDROGEN EXPLOSIVE
NO SMOKING
NAKED LIGHTS
PROHIBITED

Figure Y3
BELOW Photo of the east elevation on the hydrogen building.

Figure Y4
RIGHT Photo of the "Asbestos" sign, prohibiting entry during our visit.

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

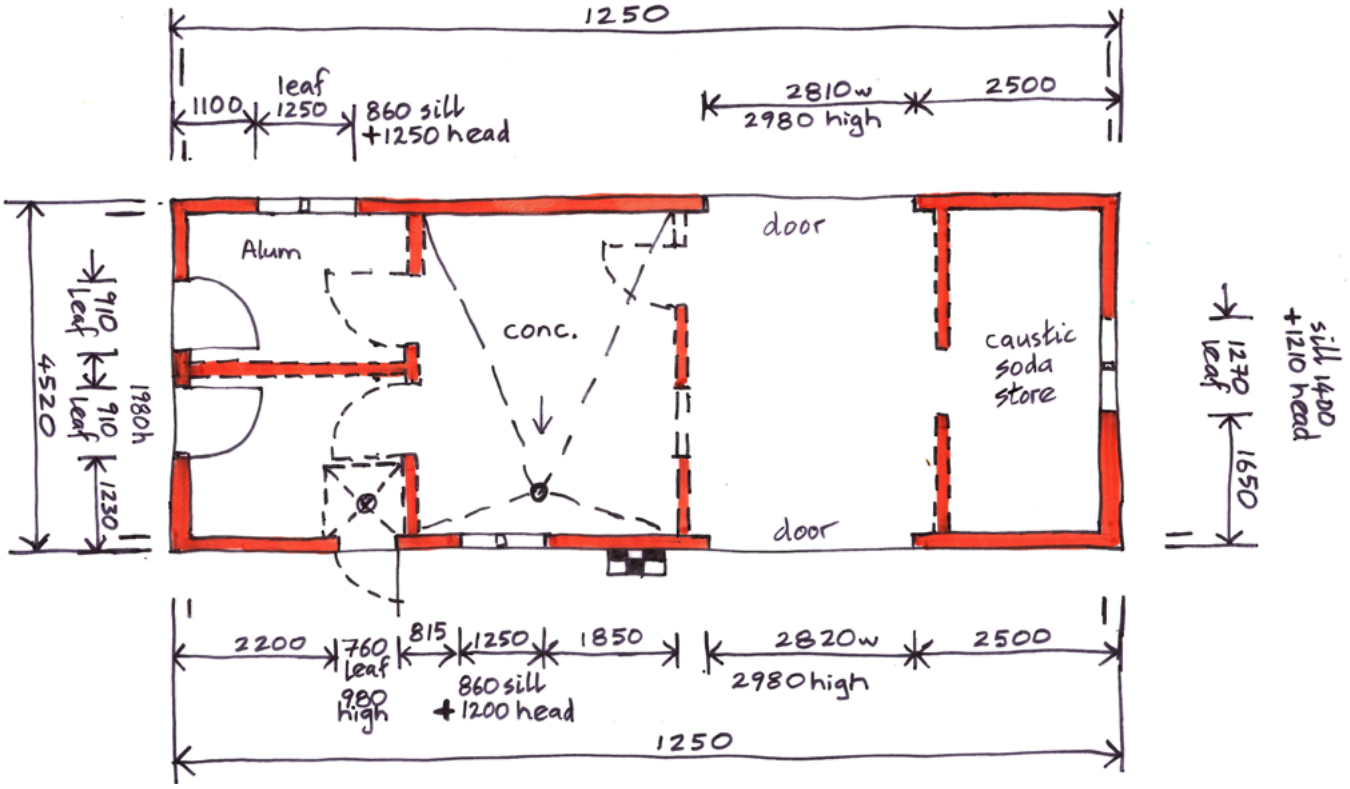


Figure Y5
ABOVE Plan of hydrogen building, dotted outlines are estimated.

Figure Y6
RIGHT South elevation

CONDITION 2Y

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION

Figure Y7
ABOVE West elevation of the hydrogen building.

Figure Y8
LEFT North elevation, like Aurora House, the plastic overcladding that was to keep the building waterproof, (instead of painting), has become brittle and in-effective, and has been broken by sea lions.

hydrogen building

PAUL CUMMACK CONSERVATION LTD revision 2017- October-1

campbell island-METEOROLOGICAL STATION

2Y CONDITION

Figure Z1
ABOVE Climatic Enclosure, from east edge, looking west.

Figure Z2
MIDDLE Centre of Climatic enclosure.

Figure Z3
BELOW Inside the climatic enclosure, from the east edge, looking east towards the Technical Building.

climatic enclosure

PAUL CUMMACK CONSERVATION LTD revision 2017-October-1

campbell island-METEOROLOGICAL STATION .

CONDITION 2Z

HIGH RESOLUTION PHOTOS

The disc attached below has high resolution photos for:-

GENERAL - all photos used in section 1.

CONDITION - all photos for section 2, with the prefix letter corresponding to the section 2 suffix letter used in this report.

INTERIOR - additional photos of the interior of each building, to assist with any planned works. The prefix letter on the photo corresponds to the letters listed in the table to the left.

A Aurora House
E DoC Hostel
F DoC Hostel Extension
G Hostel – Annex
H Hostel
K New Cool Store
L Carpenters Shop & Vege store
M Masts and foundations
M Sky Camera foundations
M Chook Shed foundations
N Bulk Food Store
O Trolley Track
P Marsden matting
Q Boat Shed – Jetty ramp
R Paint & Spirit Shed
S Jetty Store
T Technical Building
U Jetty & Crane
V Tucker Hut
W Generator House
X Bulk Oil Storage

Task Specifications For: Campbell Island Operation Endurance 2019	
Senior Ranger:	**Brent Affleck**
Delegated to:	**Norm Judd - Auckland (Historian) / Team Leader** **Megan Lawrence - Dunedin (Archaeologist)** **Karri Hartley - Dunedin (Botanist)**
Project:	**CA/15: Tucker Cove Historic Sod Hut - Priority 1**
Task:	**Clear vegetation and the construction of a sealion exclusion barrier**

Task Specifications

Vegetation Clearance:

Remove woody vegetation including caprosma/mirsene and polysticum inside the building footprint, on the sod walls, and from a buffer area of no more than 3 metres from the base of the sod wall.

Cut woody vegetation including dracophyllum from the chert pile and from no more than 3 metres from the edge of the chert pile. Leave ground cover vegetation as this is acting to protect the feature

Sight lines:

Insert 25 x 25 sighting sticks in straight lines as on the plan, roughly 100mm into the ground at 2 metre intervals (or less as dictated by rail and capping lengths) and one metre from the sod walls. Postholes to be dug in these locations. Avoid placing a post near the doorway.

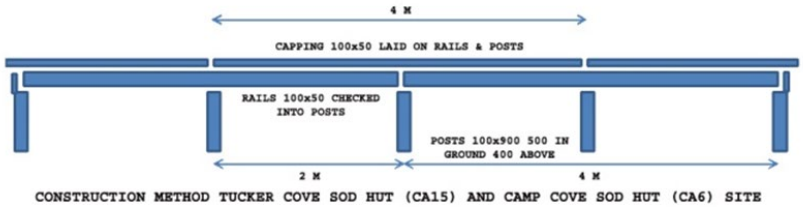
Posts:

Dig a post hole at each sighting stick to a depth of 400mm. This will leave 500mm of the posts above ground. Barrier construction including post placement must avoid damage to the chert flake pile and any other significant site features of the Tucker Cove Sod Hut site

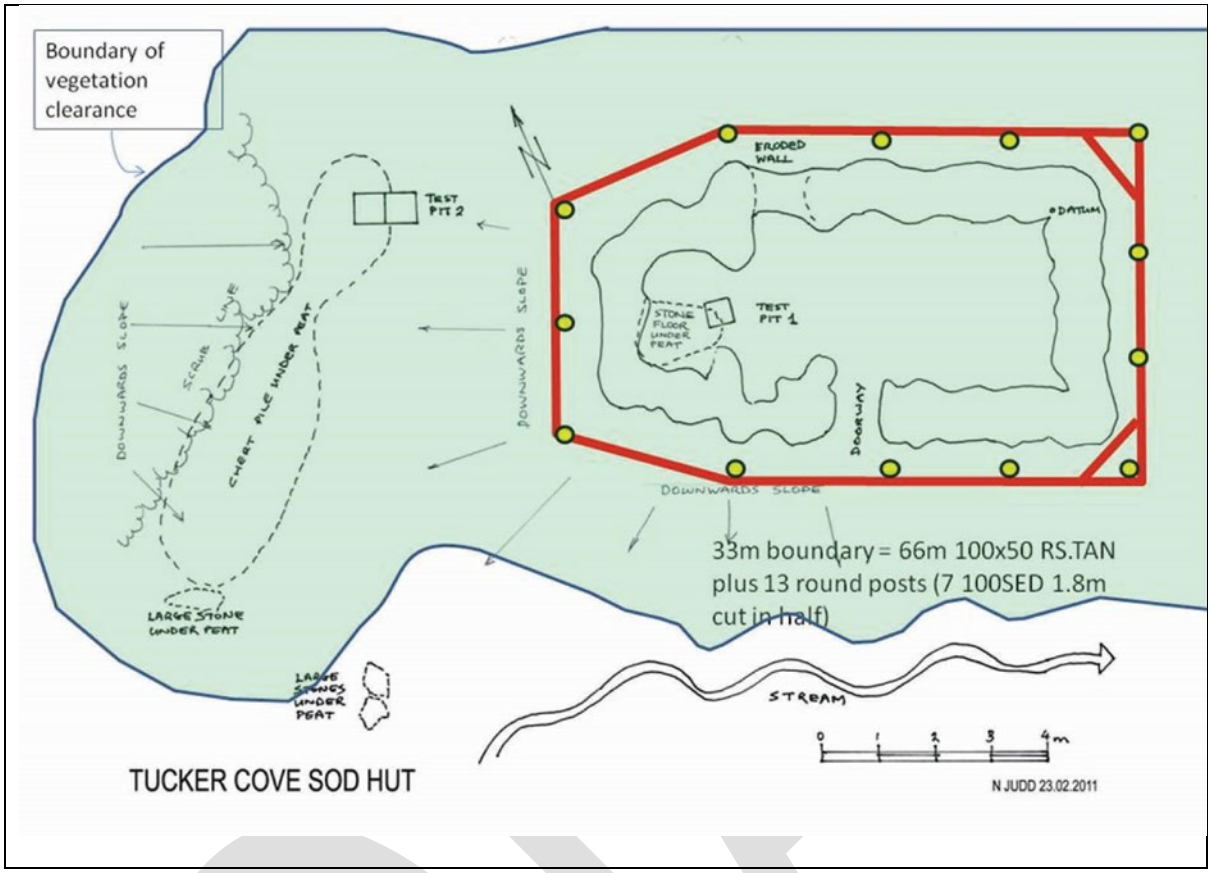
Fastening rails: Saw a 25mm by 100mm check into the outside face at the top of each post to take the 100 x 50 rail. The rails should be flush with the top of each post. Nail the rails into place. Fastening capping: Lay the rails on the rail with a 50mm overlap on each post. Ensure the capping joins are not over rail joins (see plan below). Nail capping into place.

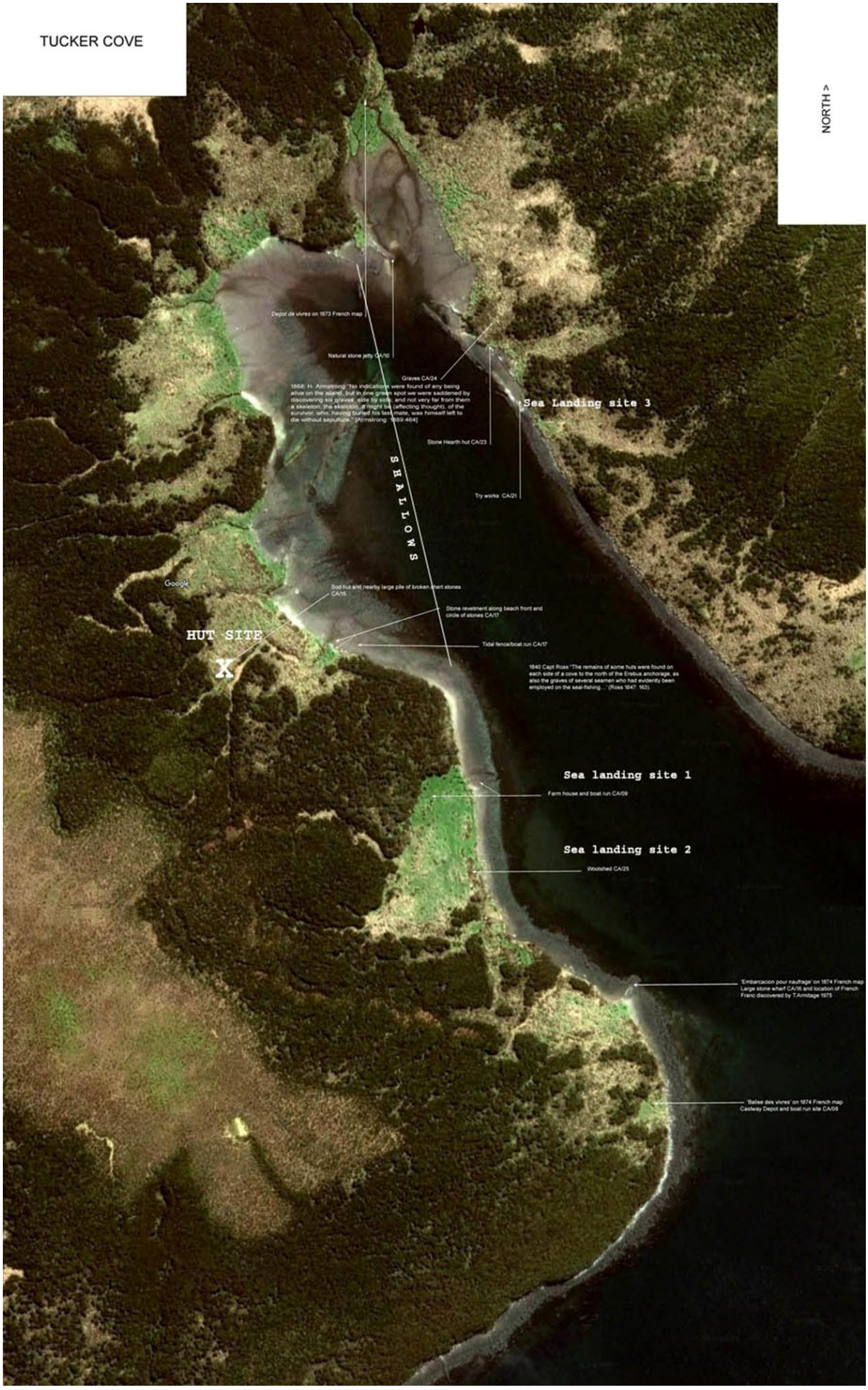
Note: If construction materials are not able to be unloaded then hole may be dug and lined with geo-cloth and then excavated earth returned to the holes.

Barrier Construction:



CONSTRUCTION METHOD TUCKER COVE SOD HUT (CA15) AND CAMP COVE SOD HUT (CA6) SITE


Boundary of vegetation clearance
TEST PIT 2
TEST PIT 1
ERODED WALL
DATUM
STONE FLOOR UNDER PEAT
DOORWAY
DOWNWARDS SLOPE
DOWNWARDS SLOPE
SCRUB
CHERT FILE UNDER PEAT
LARGE STONE UNDER PEAT
LARGE STONES UNDER PEAT
33m boundary = 66m 100x50 RS.TAN plus 13 round posts (7 100SED 1.8m cut in half)
STREAM
0 1 2 3 4m
TUCKER COVE SOD HUT
N JUDD 23.02.2011


TUCKER COVE
NORTH >
Depot de vivres on 1873 French map
Natural stone jetty CA/10
Graves CA/24
1868: H. Armstrong: "No indications were found of any being alive on the island, but in one green spot we were saddened by discovering six graves, side by side, and not very far from them a skeleton, the skeleton, it might be (affecting thought), of the survivor, who, having buried his last mate, was himself left to die without sepulture." (Armstrong 1869:464)
Sea Landing site 3
Stone Hearth hut CA/23
Try works CA/21
SHALLOWS
Google
Sod hut and nearby large pile of broken chert stones CA/15
Stone revetment along beach front and circle of stones CA/17
HUT SITE
X
Tidal fence/boat run CA/17
1840 Capt Ross "The remains of some huts were found on each side of a cove to the north of the Erebus anchorage, as also the graves of several seamen who had evidently been employed on the seal-fishing..." (Ross 1847: 163).
Sea landing site 1
Farm house and boat run CA/09
Sea landing site 2
Woolshed CA/25
'Embarcacion pour naufrage' on 1874 French map
Large stone wharf CA/16 and location of French Franc discovered by T.Armitage 1975
'Ballse des vivres' on 1874 French map
Castway Depot and boat run site CA/09

Tucker Cove

Navigation Instructions – Tucker Cove

From Norm Judd.

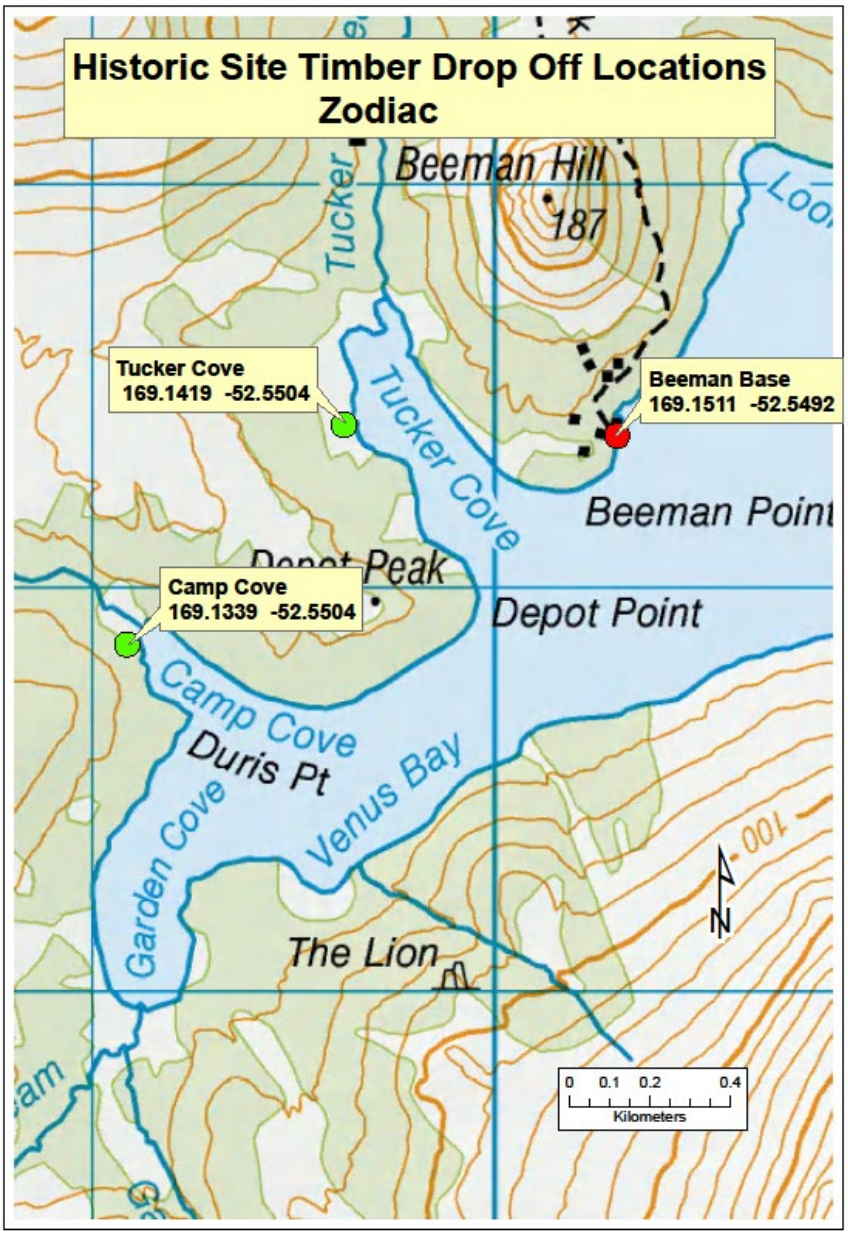
WARNING:
When motoring into Tucker Cove, be aware of a rock shelf projecting out from the left-hand shore 2/3 way into the cove (marked X) - if going beyond, keep to the right of this - it projects out about half way across the cove.

TUCKER COVE FIRST ALTERNATIVE:
I guess the easiest way to describe the location of a drop off closest to the large sod hut in Tucker Cove when coming in by sea is:
Half way into the cove on the left hand (southern) shoreline you should see a single line of big round stones about 20m long projecting out towards you.
See "line of stones" in image. - y

The intertidal at the stones has a shallow gradient.
However, to the right (west) of the stones is a rock shelf washed by high tide with a short rocky bluff on the coast behind.
The rock shelf should be accessible to sea boats at high tide only - Zodiacs mid tide.
See "1"
V

In 2011, there was a seal harem on the headland behind the bluff.
(To the right (west) of line of stones on the beach is a ring of stones about 1.5m diameter - they are covered in lichen.
The coast bank behind this is protected by a low riprap or stone wall made sometime in the 19th Century.)

TUCKER COVE SECOND ALTERNATIVE:
WARNING:
When motoring into Tucker Cove, be aware of a rock shelf projecting out from the left hand shore 2/3 way into the cove (marked X) - keep to the right of this - it projects out about half way across the cove. Once past this reef or shoal turn go straight to the old Second World War volcanic dyke jetty at the very head of Tucker Cove.
See "2"
V



Task Specifications For: Campbell Island Operation Endurance 2019	
Senior Ranger:	**Brent Affleck**
Delegation:	**Norm Judd - Auckland (Historian) / Team Leader** **Megan Lawrence - Dunedin (Archaeologist)** **Karri Hartley - Dunedin (Botanist)**
Project:	**CA/6: Camp Cove Historic Sod Hut Site – Priority 2**
Task:	**Clear vegetation and construction of a sealion exclusion barrier**

Task Specifications

Vegetation Clearance:

To remove woody vegetation (Dracophyllum), Polysticum, and flax from the building floor, fireplace, sod walls and 'ditch'.

Flax on the top of the cut bank will be trimmed back only to the top of the bank. Flax at the sides of the building site should be trimmed back to the outside of the ditch, or comparable distance. The bank at the rear and side of the hut provides some protection to the hut site therefore the barrier will be positioned around the remaining two sides.

Sight lines:

Insert 25 x 25 sighting sticks in straight lines as on the plan, roughly 100mm into the ground at 2 metre intervals (or less as dictated by rail and capping lengths) and one metre from the sod walls. Postholes to be dug in these locations. Avoid placing a post near the doorway.

Posts:

Dig a post hole at each sighting stick to a depth of 400mm. This will leave 500mm of the posts above ground. Post placement will be dictated by timber length.

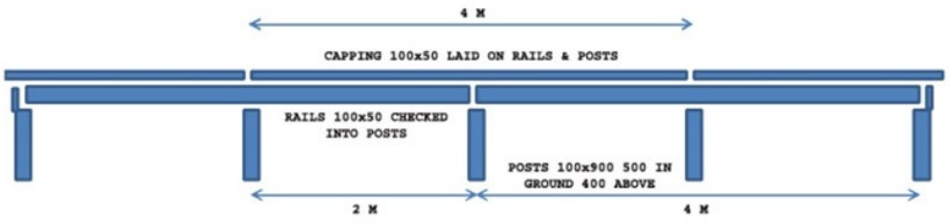
Fastening rails:

Saw a 25mm by 100mm check into the outside face at the top of each post to take the 100 x 50 rail. The rails should be flush with the top of each post. Nail the rails into place.

Fastening capping: Lay the rails on the rail with a 50mm overlap on each post. Ensure the capping joins are not over rail joins (see plan below). Nail capping into place.

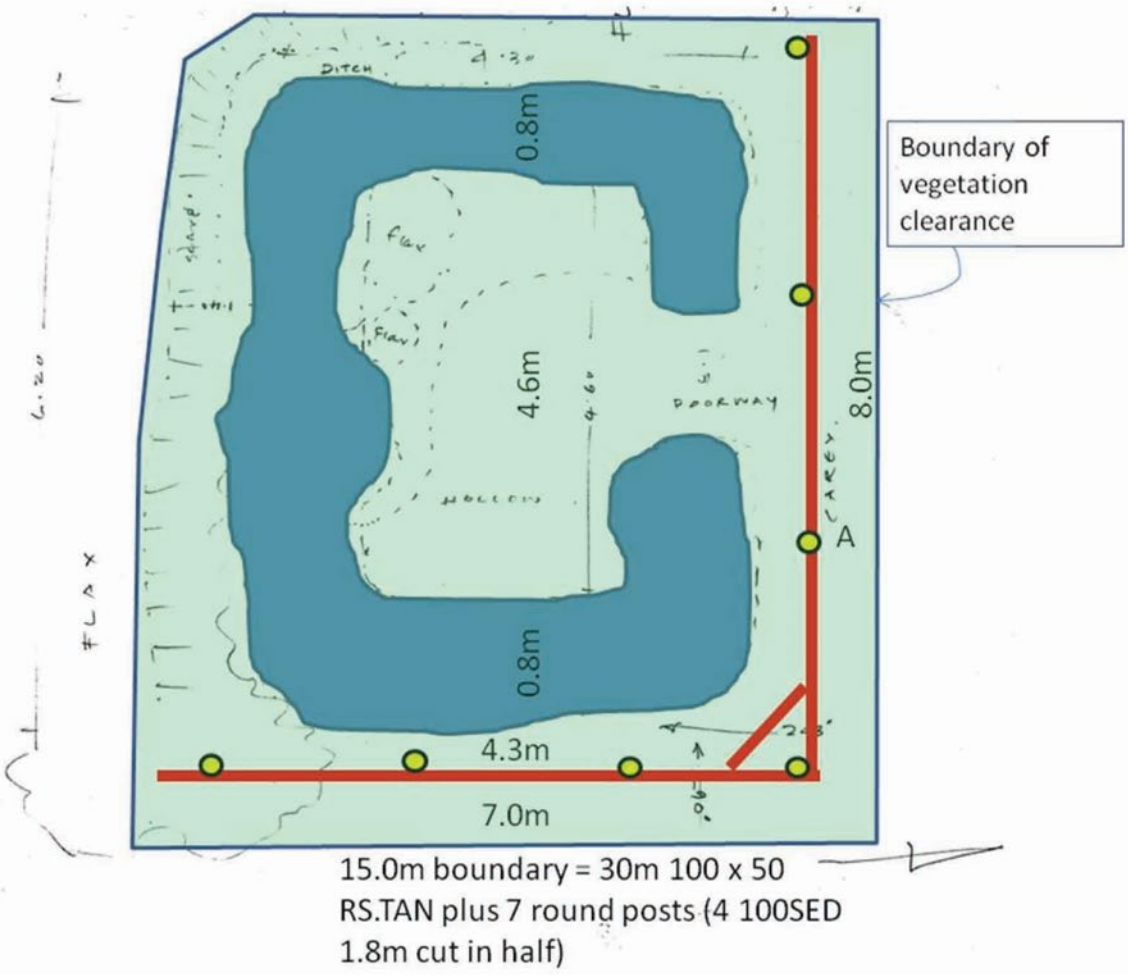
Note: If construction materials are not able to be unloaded then holes may be dug and lined with geo-cloth and excavated materials returned to the holes.

Barrier Construction:



CONSTRUCTION METHOD TUCKER COVE SOD HUT (CA15) AND CAMP COVE SOD HUT (CA6) SITE

Camp Cove Sod Hut CA6



Above: Camp Cove Sod Hut showing barrier placement, posts, and boundary of vegetation clearance

Notes:

No posts are in the doorway.

1.8m long posts will give us 2 x 0.9m lengths for 0.5m in the ground and a crawl space for pups of 0.4m high (same as Cairn Grave cemetery barriers) and a height to the tops of the capping of 0.65m.

The ground falls away all around the hut and serves as a further height deterrent to seals the closer the barrier is to the hut.

The path curves towards the bottom of the picture after leaving the entrance gap and so we'll need to be careful not to strike the path with post 'A'.

Materials:

15.0m boundary =
30m 100x50 RS.TAN
7 round posts (4 x 100SED x 1.8m cut in half)

Task Specifications For: Campbell Island Operation Endurance 2019	
Senior Ranger:	**Brent Affleck**
Delegation:	**Norm Judd - Auckland (Historian) / Team Leader** **Megan Lawrence - Dunedin (Archaeologist)** **Karri Hartley - Dunedin (Botanist)**
Project:	**CA/24: Tucker Cove Graves – Priority 3**
Task:	**Monitoring and barrier construction**

Task Specifications

Vegetation Clearance:

To remove woody vegetation from around graves and provide buffer.

Barrier Construction:

Construct barrier around one grave mound currently not protected to match the style and method of the existing barriers (see image below)

Task Specifications For: Campbell Island Operation Endurance 2019	
Senior Ranger:	**Brent Affleck**
Delegation:	**Norm Judd - Auckland (Historian) / Team Leader** **Megan Lawrence - Dunedin (Archaeologist)** **Karri Hartley - Dunedin (Botanist)**
Project:	**CA/: Duris Point Terraces**
Task:	**Recording, possible test pit, monitoring.**

Task Specifications
Vegetation Clearance: Not required to protect archaeological values of this site. Test Pitting: Test pitting to be undertaken to better understand the site features based on archaeological site assessment by Megan Lawrence.

Task Specifications For: Campbell Island Operation Endurance 2019	
Senior Ranger:	**Brent Affleck**
Delegation:	**Norm Judd - Auckland (Historian) / Team Leader** **Megan Lawrence - Dunedin (Archaeologist)** **Karri Hartley - Dunedin (Botanist)**
Project:	**CA/9 Tucker Cove Farm Homestead**
Task:	**Vegetation removal and Ensis oil application.**

Task Specifications
Vegetation Clearance: Remove vegetation from around the stove and house site to a distance of two metres. Application of Ensis Oil Metal Preservative: Apply Ensis oil to treat the stove at this site. The Ensis oil is already on site at Beeman Base having been transported aboard the 'Evoe'.

Gareth Hancock

From: Brent Affleck
Sent: Friday, 21 February 2020 3:15 pm
To: Mark Symons
Subject: Task Assignment: Campbell Island Structures End Of Life Strategy

Contect:
Phase two of Operation Endurance 2 is a short duration 'recovery' expedition to Campbell Islands between 9 March to 20 March 2020.

Purpose:
Your specific task is to gain understanding of the challenges and associated risks of replacing 2.5 km of boardwalk on the section of track between Beeman base to Col -Lyall Saddle.
This boardwalk is either at, or nearing its end of life and will be subject to a Murihiku District bid as part of a greater SSI Capex allocation for structures at 'end of life'.
The boardwalk has been inspected and maintained under the visitor assets regimes of both the Sourthern Islands or Murihiku Rangers. These boardwalks were constructed to a narrow width and not in line with the newer structures which are to standard
You would be expected to physically walk the section of track between Beeman Base and Col-Lyall Saddle gaining understanding an of logistical challenges of project managing the tasks a demolition, removal and rebuild of this remote Functional Location.
You will consider transport logistics and constraints

Quantity:
Make a recommendation to the Murihiku Ranger - Recreation/Historic of possible plans of action to achieve this Capex replacement plan

Quality:
Your finding and recommendation for consideration can be outlined in an email Murihiku Ranger - Recreation/Historic baffleck@gmail.,com

Resources:
AMIS
Murihiku Rangers on the Campbell Island as part of Operation Endurance 2 who can provide practical advice
Boardwalk design – Tim Cross. Brent to supply

Timing:
To be discussed based on your workload

Brent Affleck
Senior Ranger, Recreation/Historic
Kaitiaki Matua, Ao Hākinakina /Ao Tuku Iho
Department of Conservation--*Te Papa Atawhai*
T: +64 3 211 2400 I M +64 272452015

Murihiku / Invercargill Office
33 Don St | PO Box 743, Invercargill 9840


Short
Walks
Discover your
next adventure.
Department of
Conservation
Te Papa Atawbai

Functional Loc.	Description	Equipment	Description
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040041	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040041	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040041	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040150	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040150	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040150	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040151	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040151	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040151	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040326	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100040326	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100041974	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100041974	TUCKER COVE BOARDWALK
DS-40-120-0702	Capbl Is - North West Bay Track & Hut	100041974	TUCKER COVE BOARDWALK
DS-40-120-0613	Campbell Is -Tucker Cove Farm House Site	100057150	TUCKER COVE FARM HOUSE SIT
DS-40-120-0613	Campbell Is -Tucker Cove Farm House Site	100057150	TUCKER COVE FARM HOUSE SIT
DS-40-120-0698	Capbl Is - Tucker Cove Hut	100040647	TUCKER COVE HUT NO PLAN DE
DS-40-120-0698	Capbl Is - Tucker Cove Hut	100040647	TUCKER COVE HUT NO PLAN DE

Description	KPI Time Exc.	Priority	Order Type	Main WorkCtr
NTY2019 Structure Inspection	X	Planned	PM02	P600-I04
Clear vegetation to prevent trip hazard	X	Low	PM04	S604-R02
Netting broken	X	Low	PM04	S604-R02
NTY2019 Structure Inspection	X	Planned	PM02	P600-I04
Clear vegetation to prevent trip hazard	X	Low	PM04	S604-R02
Netting broken	X	Low	PM04	S604-R02
NTY2019 Structure Inspection	X	Planned	PM02	P600-I04
Clear vegetation to prevent trip hazard	X	Low	PM04	S604-R02
3 deck boards broken	X	Low	PM04	S604-R02
NTY2019 Structure Inspection	X	Planned	PM02	P600-I04
Netting broken	X	Low	PM04	S604-R02
NTY2019 Structure Inspection	X	Planned	PM02	P600-I04
Clear vegetation to prevent trip hazard	X	Low	PM04	S604-R02
Netting broken	X	Low	PM04	S604-R02
Enter Start Gridref		Low	PM04	S604-R02
Archaeological maintenance	X	Planned	PM10	S604-R02
NTY2019 Staff Accom Inspection Two Yearl	X	Planned	PM02	P600-I04
To be removed and not replace	X	Medium	PM04	S604-R02

Order	Sched. start	Created on	System status	KPI Date	Due Date
4706062	11/11/2019	04/03/2017	TECO CNF MANC NMAT PRC SETC	28/04/2019	28/02/2019
4705580	18/03/2020	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4705581	18/03/2020	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4706067	11/11/2019	04/03/2017	TECO CNF MANC NMAT PRC SETC	28/04/2019	28/02/2019
4705585	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4705586	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4706068	11/11/2019	04/03/2017	TECO MANC NMAT PRC SETC	28/04/2019	28/02/2019
4705587	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4705588	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4706088	11/11/2019	04/03/2017	TECO CNF MANC NMAT PRC SETC	28/04/2019	28/02/2019
4705579	18/03/2020	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4706142	11/11/2019	04/03/2017	TECO CNF MANC NMAT PRC SETC	27/04/2019	27/02/2019
4705582	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4705583	01/11/2019	27/02/2017	TECO MANC MOBI NMAT PRC SETC	27/02/2019	27/02/2017
4579910	20/02/2019	04/03/2015	TECO MANC MOBI NMAT PRC SETC	04/03/2017	04/03/2015
4735101	18/03/2020	15/09/2017	TECO CNF MANC NMAT PRC SETC	01/04/2020	01/02/2020
4706399	11/11/2019	04/03/2017	TECO MANC NMAT PRC SETC	27/04/2019	27/02/2019
4473232	18/11/2020	08/08/2013	TECO MANC MOBI NMAT PRC SETC	08/08/2014	08/08/2013

User status	TotSum (actual)
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DECL DECN	0.00
SCHD DONE	2.30
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DECL ACMP DECN	0.00
SCHD DONE	4.60
DECL DECN	0.00
SCHD DONE	2.30
DECL ACMP DECN	0.00
DECL ACMP DECN	0.00
DECL DECN	0.00
SCHD DONE	23.00
DECL DECN	0.00
DECL DECN	0.00