# PRELIMINARY ASSESSMENT OF THE HISTORICAL WWII COLLECTION OF THE PNG NATIONAL MUSEUM WITH PARTICULAR EMPHASIS ON THE KOKODA CAMPAIGN COLLECTION

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# 1 Table of Contents

“in 1942 several nations invaded my country”


## 2 Exec Summary

The cultural heritage of a country is bound up in the stories of its past, how they are told and remembered. In the case of Papua New Guinea (PNG) several nations “invaded” its territory during both wars causing significant and irreversible changes to the local inhabitants. These changes ultimately lead to the development of Papua New Guinea as an independent country. The history of PNG’s involvement in and emergence from WW1 and WW2 is preserved in written and oral evidence, the sites at which military and related actions took place, and objects used by the combatants in those conflicts. Kokoda is a major part of the story of WW2 in PNG. Kokoda is etched in the memories of both (PNG) and Australia but the WW2 experience for PNG was so much more and much of it remains hidden to this day. Hence the preservation of the objects, sites and stories of Kokoda and WW2 is essential to the continued understanding of the development of modern PNG society during WW2 and in the years afterwards.

The purpose of this report is to plot series of programs that will enable the PNG National Museum and Art Gallery to develop the competencies, procedures and approaches and necessary to carry out this function in a sustainable manner so it can preserve the Kokoda and WW2 collections. This report is also aimed at identifying the priorities in the Kokoda Collection.

The relics of war tend to be metallic. Organic relics tend to not survive. It is normally assumed that metallic objects in PNG will corrode more quickly than they elsewhere in the world because it is in the tropics. Using environmental corrosivity data for steel surfaces it can be seen that the corrosion rates for Port Moresby are approximately the same as Canberra or Melbourne but substantially less than Sydney or Newcastle in Australia. Goroka is comparable with Dubbo, NSW.

Currently all of the Kokoda and WW2 objects in the collection require varying degrees of interventive and preventive treatment to stabilize them because they are actively deteriorating and corroding. This instability is due to extensive use of outside storage and display. Also salts contaminate most objects as they have been immersed or buried at some stage in their history. Most of the unrestored vehicles and armaments have corrosion problems due to condensation and the inadequate use of corrosion inhibition and storage technologies. The distributed national collection of Kokoda and WW2 relics in PNG is significant on a world, regional and local level. It risks loosing significance due, export and scrappage; deterioration and loss of context are high. Taking advantage of the opportunities’ to develop the museums collections, collect document and conserve items in accordance with a predetermined collections plan can moderate the effects of this national loss.

The PNG National Museum collection grew in a uncoordinated way in the early 1970’s and 80’s. It has a very “Allies” bias, as one would expect from that period. Items are either “allied” or enemy. A distinctly PNG is not present. This bias needs to be addressed in the development of a PNG National Museum collections policy. A PNG story is not as obvious as it should be to the current visitor. The Collection needs to tell the visitor– the story of the two combatants (Allied and Axis) and how that affected PNG, 1942 and beyond, the stories exist

and they are magic. A few expatriate examples can be easily found[123] (they are all captivating as any museum story should be) but a concerted effort needs to be expended developing and enunciating the PNG story from a PNG perspective to the wider world. The PNG story needs to be as relevant in Rabaul or Manus Island as it is in Port Moresby or Goroka or on a web based forum site.

The current storage and office facilities for of Kokoda and WW2 objects are not adequate to ensure the security and preservation of the collection. The current office and curatorial facilities are not adequate to plan, interpret, research and document the collection.

Turning the Kokoda and WW2 collection and stories into a dynamic exhibition requires a team in the modern history unit with the appropriate vision, skills and competencies. The Curatorial have the entire core competencies required but they felt themselves that they needed more growth in the "research, exhibition development" areas. I would add to that "Project management", "digital collections management" and "resources in the field". The latter is hard without access to a reliable, high-speed Internet connection. The technical staff had major gaps in competencies in documentation, data management, understanding of deterioration, preventive conservation, and research and information acquisition. I could see most staff are well motivated and obviously enjoy their work but have no formal training in cultural heritage management or preservation. Confidence appeared to be an major issue. Capacity building thru training is essential but there are questions about what is the most effective method. Placements and Fellowships are certainly a good way of training individual staff but…. I think placing an "advisor" in the Modern History Unit to work with the staff on several projects over a period – 6 to 24 months, could have a far greater affect for all staff. Working with institutions, universities and consultants would give a good mix of capacity building experience if it was well coordinated.

The key to managing, researching, controlling, developing and exhibiting the modern history collection is the development of a collections management plan that is "owned" and supported in by the people of PNG, the staff of the museum, board and government. This will encapsulate the high level vision for the collection and the low level "how to" for those carrying out the program. The plan will allow the setting of priorities so the budget can be allocated in appropriate ways to storage, preservation and collections development.

# 3 Recommendations

- Upgrade current storage of Kokoda and WW2 objects as recommended in the short term in this report. Particular emphasis should be given to the large externally exhibited Kokoda items such as the Ford Tri-motor.
- Appoint a conservation adviser to guide the implementation of the reports recommendations in the short term.
- Provide resources to update the of Kokoda and WW2 object register of the Modern History Unit
- Get a consultant to examine the options and recommend a path to getting a secure database for of Kokoda and WW2 objects in the museum up and running. Ensure both commercial and open source databases for museum catalogues and site management are reviewed and strategies for data transfer and implementation are developed.
- Get a new store that can accommodate all current of Kokoda and WW2 objects not destined for display in the Modern History Gallery or the Assembly Building.
- Develop museum themes for the PNG story of Kokoda, WW2 and the post WW2 period – collaborate with the museum and wider community - use this as the basis for the New Exhibitions
- Get Jeep running as a capacity building project - in collaboration with John Douglas (a local WW2 vehicle enthusiast) and a Conservation Advisor.

[1] Strahan, L. *Day of Reckoning*. Pandanus Books, 2005.
[2] Denoon, D. *A Trial Separation: Australia and the Decolonisation of Papua New Guinea.* ANU Press, 2005.
[3] Hollinshed, J. *Innocence to Independence: Life in Papua New Guinea Highlands, 1956-1980.* University of Hawaii Press, 2004.

- Develop Collections plan for of Kokoda, WW2 and Post WW2 collections using a cultural heritage conservation department (eg University of Melbourne) as collaborators with the museum. Use this as an opportunity to build local programs at University of PNG and Tafe.
- Investigate external funding options for capacity building projects in collaboration with University of Melbourne and the University of PNG.

David Hallam
Tuesday, March 12, 2013

## 4 Introduction

The cultural heritage of a country is bound up in the stories of its past, how they are told and remembered. I the case of Papua New Guinea (PNG) several nations “invaded” its territory during both world wars causing significant and irreversible changes to the local inhabitants. These changes would ultimately lead to the development of Papua New Guinea as an independent country. The history of PNG’s involvement in and emergence from WW1 and WW2 is preserved in written and oral evidence, the sites at which military and related action took place, and objects used by the combatants in those conflicts. The preservation of the objects, sites and stories is essential to the continued understanding of the development of modern PNG society. To preserve the historical record it is essential to acquire and preserve the relevant documentation, and to collect and conserve the objects used in the conflicts, especially those related to World War 2. The purpose of this report is to plot series of programs that will enable the museum to develop the procedures, approaches and competencies necessary to carry out this function successfully in a sustainable manner.

This report is intended to be an initial scoping study of the PNG National Museum’s Kokoda and WW2 collections in Port Moresby, to determine the conservation issues with a view to developing a better understanding of its heritage values, and its conservation and preservation opportunities.

This report contains the following information.

- An introduction.
- An assessment of the factors affecting the deterioration and preservation of Kokoda and WW2 materials in the tropical environment of Port Moresby.
- A preliminary assessment of the condition of a representative range of artefacts.
- Discussions on risks to collections and the significance of those collections and preservation opportunities.
- A discussion on the risks to the significance of the collection.
- An assessment of the adequacy of the Museum’s storage facilities to store the artefacts
- An assessment of staff skills and capacity within the Museum to curate, conserve, exhibit and otherwise manage the collection.
- Recommendations for future work necessary to manage the collection effectively, and specifically how a collection management plan should be developed.
- An estimation of time required, costs and other constraints should be prepared for the steps required for a collection management plan.

- Annexes
    - Bibliography
    - Condition reports and treatment proposals for a representative rang of the larger objects.
    - People and Organisations consulted
    - Materials And Suppliers list
    - A listing of possible projects and institutional collaborations that the PNG National Museum and Art Gallery may wish to consider undertaking

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## 5 Assessment of the factors affecting the deterioration and preservation of Kokoda and WW2 materials in the tropical environment of Port Moresby.

The following factors affect the preservation of organic and metallic materials that make up Kokoda and WW2 materials[4]. They are;

- physical forces – stress and strain on the object
- people - theft and vandalism
- fire
- water – as liquid water
- biological agents – pests and mould
- air pollution and dust
- light, infrared and ultraviolet radiation -
- magnetic stray fields
- temperature and humidity

Looking at the materials currently present in the collections at the Modern History Unit we can identify the following as being of major concern;

- physical forces
- water
- dissociation[5]
- biological agents
- air pollution and dust
- light, infrared and ultraviolet radiation

Physical forces and dissociation are discussed in section??

## 5.1 Corrosion

### 5.1.1 Atmospheric Corrosion

The most obvious cause for concern is the corrosion of the aluminum and steel items in the collection. The “rate of corrosion” in PNG is often used as an excuse to justify the export of rare items in order to “save” them. The rate of corrosion is dependent on the materials and methods of manufacture, the pollutants and dust in the environment, salt load and the “time of wetness” [6] of the metallic surface.

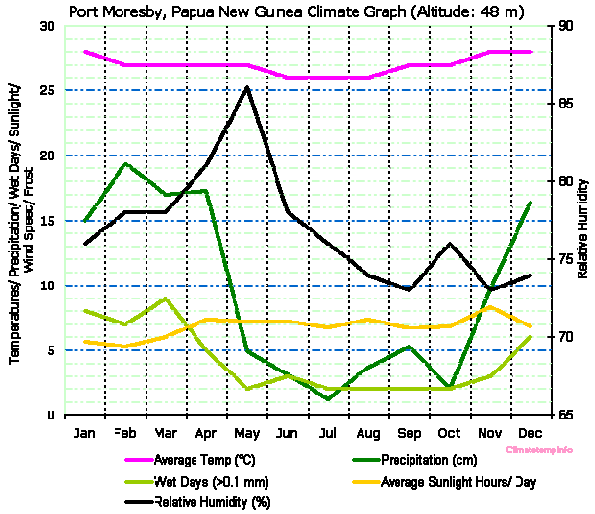


**Figure 1 Climatic details for Port Moresby**

[4] “Ten Agents of Deterioration”, n.d. http://www.cci-icc.gc.ca/caringfor-prendresoindes/articles/10agents/index-eng.aspx.

5 Loss of context as the object and it’s story are separated in such a way that they are almost impossible to re-unite see

[6] Sheldon Dean. *Maritime Corrosion in Tropical Environments*. Vol. 1391. Astm International, 2000. http://books.google.com/books?hl=en&lr=&id=rbUyFymc1qkC&oi=fnd&pg=PP8&dq=%229+2000+AMERICAN+SOCIETY+FOR+TESTING+AND+MATERIALS,+West%22+%22All+rights+reserved.+This+material+may+not+be+reproduced+or+copied,+in+whole+or+in+part,+in%22+&ots=7kEZKKOrna&sig=DZZvSTCPyoaXyugExRCtZYZr5eM.

By Kokoda and WW2 most steel was manufactured in ways that ensured its quality was uniform and did not actively promote corrosion. Unfortunately the same cannot be said for the aluminum and, magnesium alloys used in aircraft. Some were quite stable but other alloys were unstable in the medium term[7].

**Figure 2 Intergranular corrosion of a High strength alloy made on a US Aircraft main spar cap.**

The high strength 7075 alloys used by the Americans and the Japanese in the main spars of their aircraft are susceptible to inter-granular corrosion and failure as a result. This kind of corrosion will still occur in all but the most benign environments. The Zero restored by the Australian War Memorial and the RAAF required a new main spar cap because of this kind of corrosion. Aircraft at the National Air and Space Museum[8 9] in Washington DC suffered the same kind of degradation in high strength alloys as did the aircraft in PNG. Often the “high rate of degradation” is used as an excuse to “repatriate” aircraft and other WW2 hardware from PNG to places like the USA and Australia.
I would argue that this and “scrapage” are the main causes of deterioration in the distributed collection of Kokoda and WW2 items in PNG.

When we compare the corrosivity of the environment for a number of PNG and Australian sites[10] we see the corrosion rates for Port Moresby are surprisingly low. This is due to the low salt loads in the wind and the low pollution levels due to industry in PNG and the constant washing of the surface by the high rainfall. I have previously noted these phenomena in Cooktown (Far North Queensland) on cannon on the harbor foreshore.

**Table 1 ONE YEAR CORROSION RATES FOR UNCOATED MILD STEEL AT VARIOUS LOCATIONS**

| **Atmospheric classification** | |
|---|---|
| Test site | Corrosion rate - µm/yr |
| **A: Very low c1** | |
| Mt Buller (Vic) | 1 |
| **B: Low c2** | |
| Arthurs Pass (NZ) | 6 |
| Dubbo (NSW) | 4 |
| Newman (WA) | 3 |
| Toowoomba (Qld) | 9 |
| Adelaide: Woodville (SA) | 15 |
| Auckland: Parnell (NZ) | 21 |
| Brisbane: Hamilton (Qld) | 22 |
| Canberra: (ACT) | 14 |
| Hobart: City (Tas) | 11 |
| Melbourne: Clayton (Vic) | 18 |
| Perth: Bentley (WA) | 19 |
| Sydney: Ryde (NSW) | 22 |
| Wellington: Judgeford (NZ) | 19 |
| Whyalla (SA) | 13 |

7 Bellinger, N. C. “–CORROSION MORPHOLOGY: INTERGRANULAR CORROSION AND EXFOLIATION” (n.d.).
8 Mikesh, Robert. Restoring Museum Aircraft. Shrewsbury, England: Airlife, 1997.
9 Mikesh, R. C. How to Maintain Museum Aircraft Outdoors., 1989.
10 “ATMOSPHERIC CORROSIVITY ASSESSMENT”, n.d. http://elibrary.steel.org.au/shadomx/apps/fms/fmsdownload.cfm?file_uuid=A9C1CDD1-1E4F-17FA-CD90-0AD642AB6D11&siteName=asi&CFID=1447704&CFTOKEN=89881389.

| | |
|---|---|
| **C: Medium c3** | |
| Auckland: Harbour Bridge (NZ) | 49 |
| Geelong: North Shore (Vic) | 27 |
| Melbourne: Altone Beach (Vic) | 35 |
| Newcastle: City (NSW) | 35 |
| New Plymouth: Airport (NZ) | 31 |
| Perth: Kwinana (WA) | 29 |
| Port Kembla: Jetty (NSW) | 45 |
| Sydney: City (NSW) | 32 |
| **D: High c4** | |
| Greymouth (NZ) | 64 |
| Melbourne: Seaford Beach (Vic) | 68 |
| Newcastle: Boolaroo (NSW) | 63 |
| Port Pirie (SA) | 74 |
| **E-M: Very high (marine) c5** | |
| Cowley Beach (Qld) | 142 |
| Newcastle Beach (NSW) | 194 |
| **F: Inland Tropical (c2)** | |
| Goroka (P.N.G.) | 4 |
| Innisfail (Qld) – sheltered | 17 |
| - open | 25 |
| Port Moresby (PNG) | 17 |
| Rabaul (PNG) | 13 |
| Townsville (Qld) | 15 |
| Tully (Qld) | 20 |

Using this PNG corrosion rate data we can calculate how long it would take to rust trough various thicknesses of metal in the PNG external environment.

**Table 2 How long it would take for an object to rust trough?**

| | 1 Inch armor plate Steel | 18 Gauge Steel body sheet | 18 gauge Aluminum |
|---|---|---|---|
| Port Moresby | 1500 years | 88 years | 1500 years |
| Rabaul | 1900 years | 115 years | 1900 years |
| Goroka | 6375 years | | |

The problem with this very basic calculation is it does not take into consideration that most relics are sitting on earth or in swamps that have a higher corrosivity or that many objects, because of their design, trap mud and moisture so that they remain almost permanently wet in some areas of the structure. The Ford tri-motor is a good example of this process at work corrosion has been markedly quicker in areas that remained wet and in contact with soil.

### 5.1.2 Corrosion in Soil

The corrosion rate of steel in soil can range from less than 20 microns per year in favorable conditions, to 200 microns per year or more in very aggressive soils[11].

In aggressive soil a 1 inch piece of steel would last 125 years whereas it may last 10 to 100 times as long in a more benign environment.

**Figure 3 Part of a truck floor found at Basalisk. Note the holes through this 18 gauge material indicating the corrosion rate is approximately at the rate predicted in**

[11] INDUSTRIAL GALVANIZERS AUSTRALIAN GALVANIZING DIVISION, 2012. *Ingal Specifiers Manual Industrial Galvanizers Australian Galvanizing Division*. S.l.: s.n.

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**Table 2.**

### 5.1.3 Corrosion at Kokoda and WW2 in the Port Moresby Area

In the two Kokoda and WW2 sites close to Port Moresby we saw two different environments that illustrate that base corrosivity measurements are approximate at the best and that local factors both macro- and micro-environmental efffects are critically important.

**Figure 4 Gun emplacement (the Australian Heavy Battery) at Basalisk is less than 500m from the sea we would expect extensive corrosion damage but do not see it!.**

Note the thin steel chimneys have not corroded thru, as one would expect for an installation so close to the sea.

**Figure 5 Gun emplacement note damage by plant growth and lack of damage by corrosion.**

**What is the best way to reduce corrosion induced loss?**

By retrieving and moving an objects inside, out of the rain, keeping it reasonably dust free we can expect to reduce the expected corrosion rate for steel into the 1 µm/yr or less zone (ref).
This would expand the lifetime of a standard piece of 18 Gauge Steel body sheet to greater than 1500 years. Further reductions in corrosion rates can be achieved by the use of corrosion inhibitors, bagging or dehumidification[12][13]. With large objects such as aircraft the use of appropriate corrosion inhibitors and a maintenance program is the most reliable way of reducing corrosion rates to negligible in the tropics.

[12] GELNER, L., 1998. Combined Use of Vapor Corrosion Inhibitors (VCI) and Dehumidification (DH) for Plant and Equipment Mothballing or Lay-Up. In: *CORROSION 98*. 1998.
[13] LUND, C. E and ERICKSON, M. L, 1954. *Bibliography on dehumidified storage and dehumidification*. S.l. University of Minnesota, Dept. of Navy, Bureau of Yards and Docks.

**Figure 6 Object imbedded in soil will suffer higher corrosion that a object clear of the soil.**

Dehumidification and the use of “bags” to store military items is common for military “just in time” stores. These techniques have been used in Australian museums and at the National Air and Space Museum in Washington DC. My concern with these for reducing corrosion rates is that they are “failure unsafe”; ie when the power goes off or they get saturated they cause corrosion at a rate greater than if no dehumidification or bagging was done. These problems could be overcome by appropriate use of batteries and solar cells to power the system.

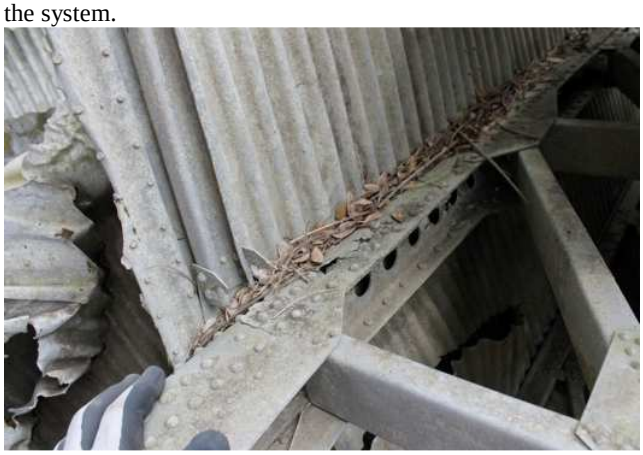

**Figure 7 Corrosion is higher where debris can trap water.**

### 5.2 Recommendations with respect to corrosion

- Ensure all objects are as clean as is appropriate to their use.
- Move all objects out of contact with soil and water.
- Move all aluminium objects out of the weather into **well-ventilated** dry storage.
- Aim to collect **representative** collections of Kokoda and WW2 objects from external sites to the museum into well-ventilated dry storage before corrosion destroys them.
- Accept that objects in the natural environment will corrode and will eventually loos all significance.
- In collaboration with a University based conservation or materials science course set up a program to measure the environmental corrosivity at a series of Museum sites in PNG.
- In collaboration with a University based conservation or materials science course set up a program to access the effectiveness of a set of corrosion inhibitors for aluminium and steel at a series of Museum sites in PNG.

## 6 A preliminary assessment of the condition of a representative range of artifacts.

A preliminary assessment of representative range of artifacts was carried out; the condition reports of some representative of artifacts are in the appendices (section 13).

The Kokoda and WW2 artifacts can be divided into 3 groups;

- Relics
- Restored objects
- Original unrestored objects
- Documentation

All of the objects were in varying degrees of active degradation. The only real exceptions were the items in the display area, which seemed to be reasonably stable.

All of the objects in the collection require varying degrees of interventive and preventive treatment to stabilize them.

These interventions vary from improving storage, removing the objects from contact with the ground, inhibiting objects, and cleaning. At the other end of the spectrum some objects require major interventive and restorative treatment to overcome the degradation that has happened in the last two to three decades of storage.

### 6.1 Recommendations from condition assessment

- Improving storage by moving the objects into a large well ventilate dry hanger type shed would do a lot to improve the objects stability.
- This could be done in such a way that the objects were documented, cleaned and inhibited as part of the process.
- The process can be used as a mentored program to build capacity and understanding of the colection

## 7 Assessment of the adequacy of the Museum’s storage facilities.

The present storage and office areas are described below;

#### 7.1.1 Display space

Two rooms in the front of the storage building. The front room contains material from the Kokoda and WW2 era whereas the back room contains material from the independence era.

**Figure 8 Internal A/C display area**

The area is air conditioned when required. While I was there the electricity was intermittent.

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**Figure 9 Internal Independence Display area**

There was no immediately obvious evidence of high humidity.  Mold on objects or flash rust on metallic artifacts. The area was clean and well cared organized.

### 7.1.2 Store area

The store area is well organized with objects neatly stacked on shelves according to type. The area does flood on the floor during wet periods, which is a matter for some concern.

**Figure 10 racking for corroded recovered armament parts**

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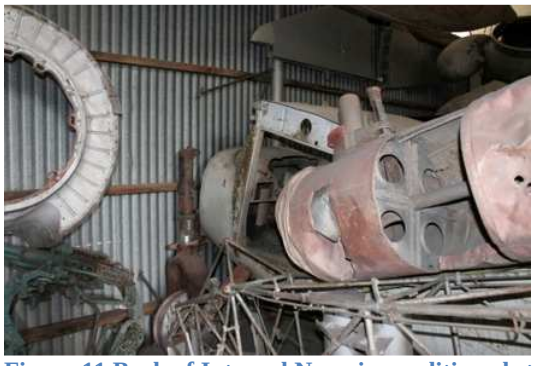

**Figure 11 Back of Internal Non air-conditioned store**

**Figure 12 Radios in storage**

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### 7.1.3 Workshop store area

The workshop serves as a store for the Daimler Sovereign, the fire engine, Wirraway, Dodge and Cessna aircraft as well as being a work area for the museum.

**Figure 13 Internal Non A/C store showing Wirraway**

The area floods along the back wall in wet periods. The walls are festooned with hanging aircraft wings and parts.

**Figure 14 Workshop area**

**Figure 15 Store flooding after rain**

### 7.1.4 Car Storage

The car storage accommodates the two Vice-Regal vehicles. It is a clean well-ventilated area but access to the vehicles is restricted, the light level is low, and the ability to move them if their brakes seize is limited. The area did not flood during rain.

### 7.1.5 Office area

The office area is an air-conditioned office on the second floor of the administration building. It is divided into two rooms, a common room with 3 workstations and a separate office for the head of section. All desks had computers and some desks were networked. Internet access was absent. Internet access is essential for the operation of a modern museum facility. It was well set up for standard administrative work and collections management but lacked facilities for curatorial research or investigation.

Figure 16 Office Areas

### 7.1.6 Secure store and Map store

This store was unlocked for the first time in 15 years just before I arrived. It is a bare room with a strong box in the corner. Most objects were stored on the floor.
The map store contains a series of WW2 maps in a map hanging cabinets. Other material requiring secure storage such as a pressure washer and tool kit are stores in this room when not in use.

Figure 17 secure stores

### 7.1.7 Library

The library is an old container into which an air-conditioner has been fitted. It contains an amazing extensive collection of texts and references about Kokoda and WW2 and WW2 material and desks for two staff. Currently the books are placed in closed brown built cupboards. This collection requires rehousing and re cataloguing so it can be used easily. It is actually quite valuable both as a resource but also in the market terms.

### 7.1.8 Open Air storage.

A well maintained lawn and garden in which the objects are parked.

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**Figure 18 external display areas**

Some are placed on clean gravel to separate them for the corrosive nature of the soil.

**Figure 19 Flooding Ford Tri Motor – a central object of the Kokoda Collection.**

Some objects are still in direct contact with the soil and are flooded when it rains.

### 7.1.9 Generic issues

The following generic issues were identified;

- All store were neat and tidy.
- Most stores were well organized.
- The open air storage was well maintained.
- Objects are not numbered in an obvious way.
- Catalogues require checking and renewal.
- Objects need to be placed on axel stands or to be lifted so they will not be flooded in rains.
- A network with access to the Internet would be advisable for curatorial work and data backup.
- Movement to re-creating a excel spread sheet of objects should be encouraged as a prerequisite to developing a museum wide object and site database.
- It is ideal if work area and objects stores can be separated

### 7.1.10 Are these facilities adequate?

The current storage and office facilities are not adequate to ensure the security and preservation of the collection. The current office and curatorial facilities are not adequate to plan, interpret, research and document the collection.

If the museum wishes the Modern history collections to exhibit, grow collection and for the research activity to flourish the current facilities are not adequate.

Undercover storage is full and cannot be effectively accessed by the public. The facilities do not provide an area for working on the collection items. Hence it will be hard to work on items safely. No common work area facilities such as lifting apparatus, fume extraction, hot work areas or layout areas are presently available.

## 7.2 Recommendations for the future

### 7.2.1 Short term - Move the current display

With the possibility of the old assembly building becoming available for display of Modern History materials it would be advantageous to move the current air conditioned displays to the old assembly building and revamping the current display area as a organic objects store, library and curatorial office.

### 7.2.2 Short term – move all objects onto jack stands

Move all wheeled objects onto jack stands and ensure no object is contacting the ground directly.

- Move Tri Motor onto stands and out of water. This is a iconic
- Move engines out of external environment and onto purpose built stands
- Trial the use of PVC air circulating car enclosing “carcoons[14]”

14 www.carcoon.com.au

### 7.2.3 Short term – Data recording

Reinvigorate the collections data base (excel) and update the hard copy catalogue in preparation to move to a Collection Management System (CMS) over the next few years.

### 7.2.4 Medium Term

With the move of some of the large Modern history objects to the new exhibition wing space will be required for treatment of these prior to display. Space will also be required if the Modern History unit is to engage on a moderately increased program of targeted acquisition. Hence I recommend that the museum search for a large aircraft hangar style building in a secure complex where they can work on and store large objects.

### 7.2.5 Long term

In the longer term the museum should try to build a large well-ventilated hanger type building for the large modern history objects that allows for controlled public access and a large object preservation program.

## 8 Discussions on risks to collections and the significance of those collections and preservation opportunities.

I view the following as being the main risks to the collection thru out PNG;

- Export and scrappage.
- Deterioration
- Loss of context
- Inappropriate restoration

### 8.1.1 Export and scrapage.

After WW2 the vast resources put into the conflict were "cleanup[15]" a process that involved a large labor force (including wartime collaborators from Europe and Chinese nationalist soldiers). This reinforced the idea that the Kokoda and WW2 relics were "just scrap". The 1952 act did not change this mindset. Even today (2012) the greatest factor in the loss of WW2 material from PNG is export and scrappage. According to the Pacific Wrecks website[16] since the 1980's, at least,12 aircraft were exported from the PNG. This process obviously came to a head with the "swamp ghost"[17] but is still an issue that raises emotions. Scrap collection is a process that is very hard to control and is driven by external metal prices.
If the museum can have a targeted collecting program aimed at getting an appropriate, but limited, collection of Kokoda and WW2 objects into clean, inhibited, safe storage in Port Moresby or regional museums it can minimize the impact of loss through scrappage and reduce the push to export Kokoda and WW2 objects.

### 8.1.2 Deterioration

Corrosion (see section 5.1 ) can be controlled to minimize the rates of deterioration thru improved storage and the use of inhibitors for metallic objects. In the longer term control of the environment thru RH% and dust control will assist in reducing deterioration thru corrosion to negligible.

### 8.1.3 Loss of context

Many of the smaller objects in the current collection have lost context and hence significance, as there is no way linking then with the site/action from which they were retrieved. This means that they go from being an object involved in this particular action to a generic excavated object. This risk can be minimized by implementing an objects labeling system from the moment the objects is recovered, so the object is linked to its site. Data bases and research methodologies are also critical to keeping these links. A rigorous archeological approach is required.

### 8.1.4 Inappropriate restoration

Loss of significance thru badly thought out "restoration" is a significant problem in the area of war relics and often leads to loss of significance as a result[18]. Well-defined aims, collection policies, appropriate strong supervision and conservation expertise will minimize the risks associated with outsourced restoration work. The past practice of giving aircraft to outside organizations to "restore" in return for access to aircraft parts is very high risk. The parts may never return and when they do they will be poorly and inappropriately "restored".

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[15] Strahan, L. *Day of Reckoning*. Pandanus Books, 2005.
16 "Pacific Wrecks - Papua New Guinea National Museum (PNG War Museum)", n.d. http://www.pacificwrecks.com/restore/png/museum.html.
17 "PUBLIC ACCOUNTS COMMITTEE", n.d. http://www.theswampghost.com/news/pac/final.html.
[18] ASHTON, John and HALLAM, David, 1990. The conservation of functional objects--an ethical dilemma. In: *AICCM bulletin*. 1990. Vol. 16, no. 3, pp. 19–26.

“in 1942 several nations invaded my country”

I would argue that if you are telling a PNG based story restoration might be inappropriate to that story.

### 8.1.5 Significance of collections

Collections have significance thru their ability to tell stories that reverberate with the present. They also have significance because of the hidden information that they can reveal[19] about the past. The current Modern History collection can fulfill both of these functions well.

Objects like the Ford Tri-motor can tell the story of colonial transport in PNG as well as the story of the Kadoka campaign. Buried objects can be interpreted as archeological objects in a way that will reveal more of their stories so long as the critical information linking them to sites is not destroyed.

The distributed national collection of Kokoda and WW2 relics in PNG is significant on a world, regional and local level.

Taking advantage of the opportunities’ to develop the museum’s collections, collect document and conserve items in accordance with a predetermined collections plan can moderate the effects of this national loss.

The PNG National Museum collection grew in a uncoordinated way in the early 1970’s and 80’s. The collections were developed from those collected by Bruce Hoy[20] at al. It would seem that the objects (mainly aircraft) were collected because of their availability and to tell the Allied WW2 story. It has a very “Allies” bias, as one would expect from that period. Items are either “allied” or enemy. A distinctly PNG is not present. This bias needs to be addressed in the development of a PNG National Museum collections policy. A PNG story is not as obvious as it should be to the current visitor. The Collection needs to tell the visitor– the story of the two combatants (Allied and Axis) and how that affected PNG, 1942 and beyond, the stories exist and they are magic. A few expatriate examples can be easily found[21][22][23] (they are all captivating as any museum story should be) but a concerted effort needs to be expended developing and enunciating the PNG story from a PNG perspective to the wider world. The PNG story needs to be as relevant in Rabaul or Manus Island as it is in Port Moresby or Goroka.

Japanese objects were collected as “the enemy” not as part of an Axis or PNG story.

This bias needs to be addressed in the development of a collections policy. A PNG story is not as obvious as it should be to the current visitor. The more I read about Kokoda and WW2 in PNG the stronger my link to the statement that in 1942 “several nations invaded our country” becomes. The Collection needs to tell me that story – the story of the two combatants (Allied and Axis) and how that affected PNG.

Currently it does not do that in a significant way.

This is why the themes for the collection are so important. They need to come from the Museum and the community. The community needs to include the wider web based community. Fundamental to this is the existence of a reliable, broadband network. Establishment of the community has to be done in consultative fashion. Workshops to develop these themes will need to be done in many locations because local viewpoints may be vastly different. A web based wiki and/or forum would also be worth considering.

As part of the development of a collections policy it is essential to undertake a significance study on the current collections to see what opportunities exist to develop the current themes. Determining what themes are significant to PNG history will be a labor-intensive job for the curatorial staff. Only when this is done can a collection of significance to the PNG story grow and develop.

### 8.1.6 Preservation opportunities.

Preservation opportunities exist for both *in situ* preservation and preservation in national and regional museums.

In order to capitalize of these the capacities of the staff and storage infrastructure need to be increased.

Provision of secure well ventilated stores would allow objects to be catalogued and preserved in a sustainable way.

Workshops run by PNGNMAG staff in regional areas would do much to increase the understanding of the history of WW2 objects and their preservation. Collaboration with some materials science sections in local and international universities could be used as a way of levering research into the materials and preservation solutions required for objects in outdoor environment.

The use of local and international volunteers could also be used to increase the preservation work done on the collections and for remedial work in the field.

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[19] PROCTER, Eileen, MCGEEHAN, Helen and HALLAM, David, 2000. Analysis of World War One German aircraft surface coatings. In: *AICCM bulletin*. 2000. Vol. 25, pp. 8–20.

20 Curator 1978 to 1988

[21] Strahan, L. *Day of Reckoning*. Pandanus Books, 2005.

[22] Denoon, D. *A Trial Separation: Australia and the Decolonisation of Papua New Guinea*. ANU Press, 2005.

[23] Hollinshed, J. *Innocence to Independence: Life in Papua New Guinea Highlands, 1956-1980*. University of Hawaii Press, 2004.

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### 8.2 Recommendations:

- The museum needs to develop a series of collection themes and priorities.
- The collection management plan needs to be developed in a collaborative way encompassing PNG Museum, Local Communities and the wider web based communities.
- The collection needs to tell the PNG story of the WW2 conflict from a PNG perspective.
- Methods of managing the use of local and international volunteers need to be investigated.

## 9 Assessment of staff skills and capacity within the Museum to curate, conserve, exhibit and otherwise manage the collection.

Looking at skill and capacity needs to be done in the context of the available infrastructure. Storage is covered in section 7.
All staff members have access to computers but currently they are not on a LAN and are not connected to the internet. Backup of data to a central file server or external hard drive is not done automatically and data loss is a significant recurrent problem.
Work areas and staff accommodation are scattered and mixed.
Equipment for materials handling or workshop activities is being developed bit needs a coordinated approach.

#### 9.1.1 Recommendations

- IT systems should be renewed and a museum wide system be implemented with database storage and backup facilities.
- As part of capacity building appropriate use of equipment, equipment supplies and security are reviewed.

### 9.2 Skills and Capacity

I will divide the staff competencies into 3 categories;

- General
- Musicological and Specialist

For these I have used the “ICOM Curricula Guidelines for Museum Professional Development”[24] as the reference rather than going for alternatives such as a list in “21st Century Skills Framework –Adapted for Libraries and Museums” [25]

#### 9.2.1 General competencies:

All museum staff should be able to demonstrate skills in and knowledge of: communication, environmental issues, evaluation techniques, financial management, information technology and its use, interpersonal relations, the role of the museum in society, administrative procedures and practices and have a well developed concept of professionalism. A more detailed listing is given in Annex section 20 and 21.

#### 9.2.2 Assessment of existing staff

I assessed the Technical and Curatorial Staff against these competencies based on my brief one week of work with them.
The Curatorial have the entire core competencies required but they felt themselves that they needed more growth in the “research, exhibition development” areas. I would add to that “Project management”, “digital collections management” and “resources in the field”. The latter is hard without access to a reliable, high-speed internet connection.
The curatorial team has the competencies and abilities to manage the processes required to grow, curate, conserve, and exhibit the collection. Currently they lack confidence in their own abilities. Their work seems to be driven by the various NIA programs originating in USA, Japan and Australia. Rather than viewing this as a constraint this should be viewed as a possible method of growing the collection when appropriate and as a capacity building opportunity.

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[24] ANON., [no date]. ICTOP Museum Career Development Tree. In: [online]. [Accessed 10 November 2012]. Available from: http://museumstudies.si.edu/ICOM-ICTOP/comp.htm#man.
[25] Institute of Museum and Library Services (2009). *Museums, Libraries, and 21st Century Skills* (IMLS-2009- NAI-01). Washington, D.C.

I was impressed by all of the staffs use of IT.
The technical staff was harder to assess. I saw major gaps in competencies in Documentation, Data Management, Understanding of Deterioration, preventive conservation, research and information acquisition. The technical staffs are well motivated and obviously enjoy their work but have no formal training in cultural heritage management or preservation.

#### 9.2.3 Training opportunities

Placements and Fellowships are certainly a good way of training individual staff but I think placing an “advisor” in the Modern History Unit to work with the staff on several projects over a period – 6 to 24 months, could have a far greater affect for all staff.
If this was done in conjunction with working with the University of Melbourne and/or the University of Canberra on the development of a collections plan it may be possible to spread the work to branch museums within the region.
Doing something of a practical nature is the best form of training, so the development of mentored projects aimed at developing particular competencies will also be important to the development of competencies. Examples might be;

- Treatment of the Jeep and the Dodge
- Development of the collections database on an open source backend
- Development of a site database (collaborate with AWM and WWW community)
- Development of a cloud based museum wiki (collaborate with WWW community)

Placements and Fellowships for degree or masters study are also essential for individual staff that is highly motivated. The AWM, NMA, University of Canberra and University of Melbourne have all expressed interest in looking at the options for these kinds of programs.
University of Melbourne is also interested in running locally based courses and student placements in the PNGNMAG. These options need to be pursued.

# 10 An estimation of time required, costs and other constraints should be prepared for the steps required for a collection management plan.

The lack of clear priorities and allocation of resources to a well-defined plan has meant the Modern History collection has grown and shrunk in response to the pressures placed upon the staff by internal and external forces. The best way of stopping this kind of influence on collections growth is to have a clearly defined plan that has been developed in consultation with the internal and external stakeholders.
The development of the collections management plan has to be done carefully and not just imposed from above or by external consultants. If the plan is not fully "owned" by the staff of the modern history unit then it will not be implemented and the time will have been wasted.
From discussions held with all of staff of the modern history unit it is obvious they passionately want better documentation, better storage, better preservation and active an programmed program of acquisitions. They also see that databases linking object story and site are essential for them to be able to tell the story of Papa New Guinea in the modern era adequately. The problem is they do not see the path they have to follow or how they can fit it in with their current MIA and administrative work.
It is essential that the development of collections management plan is not rushed but is rolled out in an incremental fashion that takes the staff with it and is based on building from the current systems.

### 10.1.1 Current systems;

The object Excel spreadsheet, site databases and site cards need to be brought up-to-date so that they contain the latest information. Likewise the current location systems in the storeroom, object labeling and registration of the objects in the collection also needs to be updated.
An active preservation program for the objects in the collection also needs to be implemented (See Recommendations for future work necessary to properly manage the collection).

### 10.1.2 Databases choices and development

Databases are not my specialty but I am a high level user and understand how essential they are to the retention of a museums cooperate knowledge.
Three database functions are needed in the Museum;

- Object database
- Site database
- Bibliographic and biographic data

These functions need to be linked and need to include objects tracking and treatment records.
It used to be the case that you had to buy your database from a software provider. This is no longer so as organizations like the Museums and Galleries commission fund the development of open source equivalents.

#### *10.1.2.1 Recommendation*

- Get a consultant to examine the options and recommend a path to getting a secure database for the museum up and running.
- Ensure both commercial and open source databases for museum catalogues and site management are reviewed and strategies for data transfer and implementation are developed.

### 10.1.3 Workshops

It’s important to start an open debate on the directions of the Modern History collections as soon as possible. I am sure there will be competing internal divisions that will need to be convinced that this is an essential enlarging of the “pie” and not a trimming of “their” programs. Change in the face of well-established programs is always hard particularly if one program has always been seen as the underdog as the modern history program has been. After starting the internal debate on the direction of the modern history unit it would be useful to bring in a cultural heritage specialist who understands the history and technology World War II objects and who is also conversant with the requirements of developing a collection management plan. Their job would be to conduct a workshop with the staff of the museum and other PNG stakeholders discuss what a PNG perspective on WW2 ( and the subsequent post war period) looks like and what are the themes that need to be explored in the exhibitions and collection acquisitions. This vision is essential as a base on which to the development of a collection management plan for modern history.

### 10.1.4 Collection Management Plan

In the western hemisphere Collections management plans are mandatory before grant giving organizations will give funds to collecting institutions for collections development or conservation. Contractors such as ICS[26] can develop these for organizations to the standard format accepted for grant giving organizations. Although the ideals of a traditional collections management plan are honorable; vision, sustainability, accountability, they may not make sense in Melanesian context. The University of Melbourne has been working with communities in East Timor to develop heritage management plans. I think it would be appropriate to get them involved in this process for the PNG National Museum and Art Gallery and to use the links for capacity building. The main problem I can see with the University of Melbourne is they do not have a deep understanding of War and World War II objects nor do they understand PNG culture and history like the late Professor Nelson - maybe Michael Pearson would be able to assist. Hence the staged approach using a team with someone like myself, Peter Stanley, John White and Alison Wain for some of the initial work would be appropriate. It is essential to use only people who understand that the story to be told is the PNG story – not some import – specially not an Australian story!

#### *10.1.4.1 Recommendation - Collection Management Plan*

A collection management plan should be developed to cover the following[27];

- Documentation
- Acquisitions or Collection Development
- Collection themes
- Accessioning
- De-accessioning and Disposals
- Collection Care
- Access
- Loans - Incoming and Outgoing

[26] “International Conservation Services - Collection Management Policies and Plans”, n.d. http://www.icssydney.com.au/index.php?id=374.
[27] “Collection Management”, n.d. http://mgnsw.org.au/resources/collection_management/.

- Security
- Display/Exhibitions
- Storage
- Copyright
- Research

### 10.1.5 Recommendation - Timeline

I recommend that this be accomplished according to the following timeline[28];

#### *10.1.5.1 Immediate.*

Carry out remedial improvements on storage.

#### *10.1.5.2 Short-term.*

Implement and update the current systems.

#### *10.1.5.3 Medium-term.*

Carry out workshops on exhibition development and collection development.

#### *10.1.5.4 Longer term.*

Carry out workshops on development of collections management plan.
Develop a collection management plan.
Get the collection development management plan signed off by the museum board.
Implement collection management plan.

## 10.2 Costs

Collection and Exhibition development workshop.
$18,000.
Development of collection development plan
$36,000

# 11 Recommendations for future work necessary to manage the collection properly

In what follows recommendations concerning future work essential for the proper maintenance of the collection is summarized. For clarity the individual actions are itemized.

## 11.1 Immediate – less than 6 months

### 11.1.1 Storage

- Place Ford tri-motor on concrete stands so that it does not rest on mud.
- Move the Ford tri-motor wings into dry storage.
- Wash all parts of the tri-motor.
- Use inhibiting inter-granular corrosion on the tri motor.
- Ensure all outside objects are clear of the dirt
- Implementing a washing program for all outdoor objects.
- Move externally displayed engines under shelter and/or off dirt

### 11.1.2 Treatment

- Clean out the spark plug valley on the cylinder head the Daimlers.
- Apply penetrating oil to the spark plugs of the Daimlers.
- Wash the Daimlers.
- Polish the Daimlers.
- Clean Daimlers internally
- Apply water displacing corrosion preventatives around the engine bay.
- Vacuum interiors of the Daimlers.
- Placing all rubber wheeled objects on jack stands.

28 See “Recommendations for future work necessary to properly manage the collection”.

#### 11.1.3 Planning

- Commence discussions within the museum on developing PNG based themes for future exhibitions and collections development in modern history.
- Initiate planning for Exhibitions in Old assembly building
- Undertake Review of current documentation on collection
- Start scoping review of data base options for Museum
- Re-scope work proposed for Jeep with John Douglas
- Work on Jeep with John Douglas’s assistance and use it as a capacity building project.Scope the condition and status of PNG Objects currently in Australia for restoration.
- Employ mentor for a period to oversee these projects and use them to build capacity.

### 11.2 Short term – less than a year

#### 11.2.1 Storage

- Reorganise the books in the library and putting them on shelves.
- Ensure that the maps can be accessed.
- Remove items from the armoury that do not need to be there.
- Place shelves in the armoury.
- Carry out workshops on development of collections management plan (as discussed above).
- Start review of data base options for Museum
- Complete review of data base options for Museum
- Report on data base options for Museum collections and sites, including costing’s of open and closed source options.
- Complete Review of current documentation on collection
- Monitor environment in museum spaces (wet and dry seasons)
- Monitor conditions in armoury.
- Improve the drainage of the museum’s block to minimize water damage to exhibits

#### 11.2.2 Treatment

- Experiment with tannate treatment on some of the painted objects outside the museum.
- Experiment with tannate treatment on some of the retrieved corroded objects.
- Devise and implement a maintenance program for some of the outside objects

#### 11.2.3 Planning

- Commence discussions with stakeholders (Staff members, Museum Board, Communities, special interest groups, Regional groups, politicians, WWW communities of interest) on developing PNG based themes for future exhibitions and collections development.
- Negotiate the return of PNG Objects currently in Australia for restoration.
- Scope treatment required on PNG Objects currently in Australia for restoration.
- Investigate moving them into the air-conditioned exhibition space as exhibition is moved into the old assembly building.
- Timetable return storage and treatment of PNG Objects currently in Australia for restoration.
- Initiate a study of how a workshop space could be made available for work on large objects.
- Re-scope work proposed for Dodge Start dodge treatment.
- Scope capacity building opportunities for staff
- Scope Wirraway treatment
- Develop a capacity building program and methods to fund such a program.
- Scope the acquisition of a large, well ventilated, warehouse for storage of the LTO collection
- Scope capacity building opportunities in house and externally.
- Washing or dusting objects as part of a schedule.

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#### 11.2.4 Exhibitions

- Start planning for Exhibitions in Modern History Display
- Link Museum to the internet with a high speed broadband connection

### 11.3 Medium Term – less than 2 years

#### 11.3.1 Storage

- Implement Data Base for museum collections.
- Implement Data Base for sites linked to museum collections

#### 11.3.2 Treatment

- Start preparing other objects for the Modern history display.
- Choose a Daimler to treat.
- Decide on a treatment methodology – in-house (managed) or contract.
- Acquire funding for Daimler treatment
- Trial Carcoon[29] storage system.
- Scope the treatment of the Cessna
- Set up corrosivity monitors at Port Moresby sites.
- Set up a Workshop space
- Equip a workshop space with essential equipment and tools
- Start the Wirraway treatment after the Dodge treatment is completed.

#### 11.3.3 Planning

- Implement a capacity building program for staff.
- Start to populate the site and object data bases
- Start the process of return, storage and treatment of PNG Objects currently in Australia for restoration.
- Develop a collection management plan.
- Import current Excel data to site and object data base
- Have the collection development management plan signed off by the museum board.

### 11.4 Long Term – greater than 3 years

#### 11.4.1 Storage

- Continue to populate and maintain site and object data base
- Link the site and object data base so that it is available on the internet
- Implement a collection management plan.

#### 11.4.2 Treatment

- Reassemble and treat Cessna
- Trial "green" corrosion inhibition for Aluminium in the exterior environment.
- Trial "green" corrosion inhibition for steel in the exterior environment.
- Carry out remaining treatments outlined in "object treatment"
- Measure the environmental corrosivity of the museum site and compare with data from WW2 sites
- Set up corrosivity monitors on non-local museum sites.

[29] www.carcoon.com.au

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### 11.4.3 Planning

- Develop from the museums experience methods of developing and implementing “collections development plans” in the Melanesian region.
- Continually refine the vision and themes of the Museum
- Aim to become a centre of excellence in WW2 site archaeology and preservation

| Object | Proposed treatment options | Costings. | Labor - months | Contract | Materials | Recommendations. |
|---|---|---|---|---|---|---|
| | | | | | | |
| P38 | | | | | | Develop story and address requirements of the aircraft in the collections development process. Consider doing this in collaboration with AWM or NMA as a capacity building exercise. |
| | | | | | | Retrieve other parts from Australia, stabilize and reassemble as a wreck with a story. |
| | | | | | | |
| Wirraway | Clean, catalogue, inhibit and reassemble. | | 10 | 4 | 3,000 | Clean, catalogue, inhibit and reassemble aircraft |
| | Could continue to be stored with wings removed but only after a full assembly. | | | | | Development skills for staff. |
| | | | | | | |
| Cessna 1947 | Basic storage | | 0.25 | 0.10 | 2,200 | Carry out basic storage in the short term. |
| | Complete for display | | 24 | | 15,000 | Review use of the A/C in line with collections development plan. |
| | | | | | | |
| Daimler 01 | Cleaning | | 0.50 | 0.20 | 500 | Initially |
| | Carcoons | | | | 2,000 | Clean, Inhibit and polish vehicle. |
| | In House restoration | | 10 | 5 | 55,000 | Medium term |
| | Contract restoration | | 1 | | 124,000 | Document object against parts manual |
| | | | | | | Develop options for full restoration either thru overseas contract or thru an in house program with specialized parts carried out by contractors. |
| | | | | | | Long term |
| | | | | | | Carry out full restoration. |
| | | | | | | |
| Daimler PNG GD 000 | Inhibit and mothball object. | | 0.50 | 0.20 | 500 | Clean, Inhibit and polish vehicle. |
| | Mechanical restoration and minor aesthetic reintegration. | | 6 | 3 | 29,000 | Place on jack stands |
| | Restore object completely with a conservation bias. | | 10 | 5 | 60,000 | Set up a carcoon |
| | Contcars | | 1 | | 80,000 | Document vehicle against spare part manual |
| | | | | | | Develop options for mechanical restoration and minor aesthetic reintegration thru an in house program with specialized parts carried out by contractors. |
| | | | | | | Carry our mechanical restoration and minor aesthetic reintegration.. |
| | | | | | | |
| Daimler Sovereign | Inhibit and mothball object. | | 0.50 | 0.10 | 3,500 | Clean, Inhibit and polish vehicle. |
| | Mechanical restoration and minor aesthetic reintegration. | | 6 | 3 | 46,000 | Develop options for Mechanical restoration and minor aesthetic reintegration. |
| | Restore object completely with a conservation bias. | | 10 | | 45,000 | Either thru overseas contract or thru an in house program with specialized parts carried out by contractors. |
| | Contract | | 1 | | 55,000 | Mechanical restoration and minor aesthetic reintegration. |
| | | | | | | |
| Dodge Weapons carrier | | | | | | The Dodge should be treated in parallel with the jeep. |
| | Clean and Mothball object for static display. | | 0.50 | 0.10 | 100 | The vehicle is gradually brought to a running maintainable state. |
| | Clean, get running and maintain. | | 1 | 0.50 | 1,000 | That the museum; |
| | Rebuild engine | | 1 | 0.50 | 7,000 | · Develop strategies for use and maintenance. |
| | | | | | | · Budget and schedule use and maintenance program. |
| | | | | | | · Develop a exhibition and outreach program based scheduled use and maintenance. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ford Tri-Motor | | | | | | |
| | Basic storage | | 0.25 | 0.10 | 3000 | Prepare for Basic Storage as soon as is feasible |
| | Basic Display | | 0.50 | 0.20 | 4000 | Lift A/C out of water. |
| | Basic Display with wings and tailplane assembled. | | | | 25000 | Document aircraft against parts manual. |
| | Complete Display | | 72.00 | 24.00 | 150000 | Collect stories of the aircraft and its impact on PNG society. |
| | | | | | | Place wings in storage under cover. |
| | | | | | | Aim for either display of the fuselage or the fuselage and wings in the Modern History extension. Space will be a major consideration. |
| | | | | | | Review use of the A/C in line with collections development plan. |
| | | | | | | |
| GMC Truck | Short term | | 0.50 | | 1000 | Continue to display externally and maintain |
| | Medium Term | | 0.50 | | 1000 | Ascertain the significance of this object and it’s story. |
| | | | | | | Is it’s post war history more important? |
| | | | | | | How should it be interpreted? |
| | | | | | | |
| Jeep | Clean and Mothball object for static display. | | 0.50 | | 100 | The vehicle is gradually brought to a running maintainable state. |
| | Clean, get running and maintain. | | 1 | | 1,000 | That the museum; |
| | Rebuild engine | | 1 | | 7,000 | · Develop strategies for use and maintenance. |
| | | | | | | · Budget and schedule use and maintenance program. |
| | | | | | | · Develop a exhibition and outreach program based scheduled use and maintenance. |
| | | | | | | |
| Stuart Tank | Short term | | 0.50 | | 1,000 | Stabilize. |
| | Medium term | | 0.50 | | 1,000 | Continue outside exhibition. |
| | | | | | | Reintegrate interpretation. |
| | | | | | | Replace major missing parts? |
| | | | | | | What is the PNG story? |
| | | | | | | |
| Studebaker Truck | Short term | | 0.50 | | 1,000 | Continue to display externally and maintain |
| | Medium term | | 0.50 | | 1,000 | |
| | | | | | | |
| Wirraway | Medium Term | | 10 | 3.00 | 5,000 | Clean, catalogue, inhibit and reassemble aircraft |
| | | | | | | |
| Artillery and Armaments on display outside | Remove from contact with soil | | 1 | 0.25 | 4,000 | Curatorial to assess the color required for outdoor display for each object |
| | Tannate based anti- corrosive paint for the panted items. | | | | | Continue with a paint based maintenance regime for the panted items. |
| | Curatorial to select colors based on original colors. | | | | | Investigate the use of tannate based inhibitors for the exterior unpainted iron. |
| | Trial un painted tannate treatment on unpainted items (relics) | | | | | |
| | Trial the use of Carboxylates on unpainted items. | | | | | |
| | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aircraft parts on display outside | Removing from contact with water and soil. | | 1.00 | | 4,000 | Remove from contact with soil, wash, WDCP treat, place as many as possible under cover. |
| | Washing, cleaning and rehouse undercover. | | | | | |
| | Inhibit with WDCP | | | | | |
| | | | | | | |
| Totals | | | 173.50 | 49.25 | 737,900 | |

Table 2. Object treatment and the costs associated with the treatment. See Appendix 14 for detail

### 11.5 Proposed budget

This section presents an estimation-itemized cost for the project if all of the suggested options were to be carried out.
I do not believe this is achievable and that in the longer term priorities can be refined.
Priorities need to be set in line with collections requirements. Only only carrying out restoration on a few priority vehicles and mothballing the rest into a maintainable state can limit expenditure.
This is why the development of a theme for the exhibitions and collections are critical to aid these decisions.

### 11.6 Summary

| | |
|---|---|
| Staff time required - | 14 person years |
| Conservation Support contracts | 4 years $80000/ year plus support costs |
| Materials and Supplies | AUD 700,000 |

## 12 Conclusions

The Museum and Art Gallery of PNG has an outstanding collection of important Kokoda and WW2 objects that are deteriorating actively, lack context and interpretation as a PNG story.
I feel the application of recommendations made in this report will go some way to making this collection a critically important collection of WW2 material in which speaks to a local and world audience.

## 13 Recommendations

- Upgrade current storage of Kokoda and WW2 objects as recommended in the short term in this report. Particular emphasis should be given to the large externally exhibited Kokoda items such as the Ford Tri-motor.
- Appoint a conservation adviser to guide the implementation of the report’s recommendations in the short term.
- Provide resources to update the of Kokoda and WW2 object register of the Modern History Unit
- Get a consultant to examine the options and recommend a path to getting a secure database for of Kokoda and WW2 objects in the museum up and running. Ensure both commercial and open source databases for museum catalogues and site management are reviewed and strategies for data transfer and implementation are developed.
- Get a new store that can accommodate all current of Kokoda and WW2 objects not destined for display in the Modern History Gallery or the Assembly Building.
- Develop museum themes for the PNG story of Kokoda, WW2 and the post WW2 period – collaborate with the museum and wider community - use this as the basis for the New Exhibitions
- Get Jeep running as a capacity building project - in collaboration with John Douglas (a local WW2 vehicle enthusiast) and a Conservation Advisor.

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Removed 120 pages

# 16 Complete Recommendations

A listing of all recommendations as one listing

- Develop collection themes through a consultative process both within the Museum and the wider community
- Develop a collections plan through a consultative process.
- Work towards a site and collection database.
- Reorganize the store to minimize deterioration.
- Implement a sustainable collections conservation program as part of the collections plan.
- Build capacity in technical and curatorial staff thru competency based projects.
- Set up a system of contactors and volunteer mentors who can work with the staff to build competencies in collections management and conservation10.8
- Develop exhibition plans for the assembly and the new modern history wing in collaboration with NMA, AWM and Universities.
- Work with Universities to build collaborative programs that develop the collections plan and other competencies on formal and informal lines.
- Develop a wide-reaching vision for the Modern history unit with the aim to t become a world leader in the archaeology of conflicts and the preservation of artefacts related to conflicts.
- Upgrade current storage as recommended in the short term in this report.
- Investigate appointing a conservation adviser to guide the implementation of the reports recommendations in the short term.
- Provide resources to update object register of the Modern History Unit
- Look into getting a new store that can accommodate all current objects not destined for display in the Modern History Gallery or the Assembly Building.
- Develop PNG story of WW2 and the post WW2 period – collaborate with the NMA (Peter Stanley)– use this as the basis for the New Exhibitions
- Get Jeep running – in collaboration with John Douglas and the Conservation Advisor
- Develop Collections plan using University of Melbourne as collaborator’s and contractors.
- Investigate funding options for capacity building projects.

## 16.1 Storage

### 16.1.1 Main Recommendations

- Ensure all objects are as clean as is appropriate to their use.
- Move all objects out of contact with soil and water.
- Move all aluminium objects out of the weather into well-ventilated dry storage.
- Aim to collect representative collections of WW2 objects from external sites to the museum into well-ventilated dry storage before corrosion destroys them.

- Accept that objects in the natural environment will corrode and will eventually loose all significance.
- In collaboration with a University based conservation or materials science course set up a program to measure the environmental corrosivity at a series of Museum sites in PNG.
- In collaboration with a University based conservation or materials science course set up a program to access the effectiveness of a set of corrosion inhibitors for aluminum and steel at a series of Museum sites in PNG.
- Improving storage by moving the objects into a large well ventilate dry hanger type shed would do a lot to improve the objects stability.
- This could be done in such a way that the objects were documented, cleaned and inhibited as part of the process.
- The process can be used as a mentored program to build capacity and understanding of the colection

### 16.1.2 Short term - Move the current display

With the possibility of the old assembly building becoming available for display of Modern History materials it would be advantageous to move the current air conditioned displays to the old assembly building and revamping the current display area as a organic objects store, library and curatorial office.

### 16.1.3 Short term – move all objects onto jack stands

Move all wheeled objects onto jack stands and ensure no object is contacting the ground directly.

- Tri Motor
- Engines
- Trial carcoons

### 16.1.4 Short term – Data recording

Reinvigorate the collections data base (excel) and update the hard copy catalogue. In preparation to move to a Collection Management System (CMS) over the next few years.

### 16.1.5 Medium Term

With the move of some of the the large Modern history objects to the new exhibition wing space will be required for treatment of these prior to display. Space will also be required if the Modern History unit is to engage on a moderately increased program of targeted acquisition. Hence I recommend that the museum search for a large aircraft hanger style building in a secure complex where they can work on and store Large objects.

### 16.1.6 Long term

In the longer term the museum should try to build a large well-ventilated hanger type building for the Large Modern history objects that allows for controlled public access and a large object preservation program.

- The museum needs to develop a series of collection themes and priorities.
- The collection management plan needs to be developed in a collaborative way encompassing PNG Museum, Local Communities and the wider web based communities.
- The collection needs to tell the PNG story of the WW2 conflict from a PNG perspective.
- Methods of managing the use of local and international volunteers need to be investigated.
- IT systems are reviewed and a museum wide system is implemented with databases and backups.
- As part of capacity building appropriate use of equipment, equipment supplies and security are reviewed.

### 16.1.7 Training opportunities

Placements and Fellowships are certainly a good way of training individual staff but I think placing an “advisor” in the Modern History Unit to work with the staff on several projects over a period – 6 to 24 months, could have a far greater affect for all staff.
If this was done in conjunction with working with the University of Melbourne and/or the University of Canberra on the development of a collections plan it may be possible to spread the work to branch museums within the region.
Doing something is the best training, so the development of mentored projects aimed at developing particular competencies will also be important to the development of competencies.

“in 1942 several nations invaded my country”

Examples could be;

- Treatment of the Jeep and the Dodge
- Development of the collections database on an open source backend
- Development of a site database (collaborate with AWM and WWW community)
- Development of a cloud based museum wiki (collaborate with WWW community)

Placements and Fellowships for degree or masters study are also essential for individual staff that is highly motivated. The AWM, NMA, University of Canberra and University of Melbourne have all expressed interest in looking at the options for these kinds of programs.
University of Melbourne is also interested in running locally based courses and student placements in the PNGNMAG. These options need to be pursued.

- Both commercial and open source databases for museum catalogues and site management are reviewed and strategies for data transfer and implementation are developed.
- Collections development

### 16.1.8 Stages

***Immediate.***
Carry out remedial improvements on storage.

***Short-term.***
Implement and update the current systems.

***Medium-term.***
Carry out workshops on exhibition development and collection development.

***Longer term.***
Carry out workshops on development of collections management plan.
Develop a collection management plan.
Get the collection development management plan signed off by the museum board.
Implement collection management plan.

## 16.2 Recommendations for future work necessary to properly manage the collection.

### 16.2.1 Immediate – less than 6 months

#### *16.2.1.1 Storage*

- Ford tri-motor on concrete stands out of the mud.
- Moving the Ford tri-motor wings into dry storage.
- Washing all parts of the tri-motor.
- Inhibiting inter granular corrosion on the tri motor.
- Ensure all outside objects are clear of the dirt
- Implementing a washing program for outdoor objects.
- Moving externally displayed engines under shelter and/or off dirt

#### *16.2.1.2 Treatment*

- Cleaning out the spark plug valley on the cylinder head the Daimlers.
- Applying penetrating oil to the spark plugs of the Daimlers.
- Wash the Daimlers.
- Polish the Daimlers.
- Clean Daimlers internally
- Apply water displacing corrosion preventatives around the engine bay.
- Vacuum interiors of the Daimlers.
- Placing all rubber wheeled objects on jack stands.

#### *16.2.1.3 Planning*

- Start discussions within the museum on developing PNG based themes for future exhibitions and collections development in modern history.
- Start planning for Exhibitions in Old assembly building
- Start Review of current documentation on collection
- Start scoping review of data base options for Museum
- Re-scope work proposed for Jeep with John Douglas
- Scope the condition and status of PNG Objects currently in Australia for restoration.
- Work on Jeep with John Douglas’s assistance and use it as a capacity building project.
- Employ mentor for a period to oversee these projects and use them to build capacity.

### 16.2.2 Short term – less than a year

#### *16.2.2.1 Storage*

- Reorganizing the books in the library and putting them on shelves.
- Ensure that the maps can be got at accessed.
- Removing items from the armory that don’t need to be there.
- Placing shelves in the armoury.
- Carry out workshops on development of collections management plan.
- Start review of data base options for Museum
- Complete review of data base options for Museum
- Report on data base options for Museum collections and sites, including costing’s of open and closed source options.
- Complete Review of current documentation on collection
- Monitor environment in museum spaces (wet and dry seasons)
- Monitor conditions in armoury.
- Improving the drainage of the museum’s block

#### *16.2.2.2 Treatment*

- Experimenting with tannate treatment on some of the painted objects outside the museum.
- Experimenting with tannate treatment on some of the retrieved corroded objects.
- Implementing a maintenance program for some of the outside objects

#### *16.2.2.3 Planning*

- Start discussions with stakeholders on developing PNG based themes for future exhibitions and collections development.
- Negotiate the return of PNG Objects currently in Australia for restoration.
- Scope treatment required on PNG Objects currently in Australia for restoration.
- Scope moving them into the air-conditioned exhibition space as exhibition is moved into old assembly building.
- Timetable return storage and treatment of PNG Objects currently in Australia for restoration.
- Start to scope how a workshop space could be made available to work on large objects.
- Re-scope work proposed for Dodge Start dodge treatment.
- Scope capacity building opportunities for staff
- Scope Wirraway treatment
- Develop a capacity building program and methods to fund such a program.
- Scope the acquisition of a large, well ventilated, warehouse for storage of the LTO collection
- Scope capacity building opportunities in house and externally.
- Washing or dusting objects as part of a schedule.

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#### *16.2.2.4 Exhibitions*

- Start planning for Exhibitions in Modern History Display
- Link Museum to WWW

### 16.2.3 Medium Term – less than 2 years

#### *16.2.3.1 Storage*

- Implement Data Base for museum collections.
- Implement Data Base for sites linked to museum collections

#### *16.2.3.2 Treatment*

- Start preparing other objects for the Modern history display.
- Choose a Daimler to treat.
- Decide on a treatment methodology – in-house (managed) or contract.
- Acquire funding for Daimler treatment
- Trial Carcoons
- Scope treatment of cessna
- Set up corrosivity monitors on Port Moresby sites.
- Set up a Workshop space
- Sparingly equip a workshop space
- Start Wirraway treatment after dodge is finished

#### *16.2.3.3 Planning*

- Implement capacity building program for staff.
- Start to populate site and object data base
- Start process of return, storage and treatment of PNG Objects currently in Australia for restoration.
- Develop a collection management plan.
- Import current Excel data to site and object data base
- Get the collection development management plan signed off by the museum board.

### 16.2.4 Long Term – greater than 3 years

#### *16.2.4.1 Storage*

- Continue to populate and maintain site and object data base
- Link site and object data base to be available on the WWW
- Implement collection management plan.

#### *16.2.4.2 Treatment*

- Reassemble and treat Cessna
- Trial “green” corrosion inhibition for Aluminium in the exterior environment.
- Trial “green” corrosion inhibition for steel in the exterior environment.
- Carry out remaining treatments outlined in “object treatment”
- Measure the environmental corrosivity of the museum site and compare with with data from WW2 sites
- Set up corrosivity monitors on Non local museum sites.

#### *16.2.4.3 Planning*

- Develop from the museums experience methods of developing and implementing “collections development plans” in the Melanesian region.
- Continually refine the vision and themes of the Museum
- Aim to become a centre of excellence in WW2 site archaeology and preservation

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## 16.3 General Recommendations

- Develop collection themes thru a consultative process both within the Museum and the wider community
- Develop a collections plan thru a consultative process.
- Work towards a site and collection database.
- Reorganize the store to minimize deterioration.
- Implement a sustainable collections conservation program as part of the collections plan.
- Build capacity in technical and curatorial staff thru competency based projects.
- Set up a system of contactors and volunteer mentors who can work with the staff to build competencies in collections management and conservation.
    - Get the jeep running
    - Develop exhibition plans for the assembly and the new modern history wing in collaboration with NMA, AWM and Universities.

Work with Universities to build collaborative programs that develop the collections plan and other competencies on formal and informal lines.
Develop a wide-reaching vision for the Modern history unit.
Eg to be a world leader in conflict archaeology and preservation.

### 16.3.1 Recommendations

The museum needs to develop a series of collection themes and priorities.

The collection management plan needs to be developed in a collaborative way encompassing PNG Museum, Local Communities and the wider web based communities.

The collection needs to tell the PNG story of the WW2 conflict from a PNG perspective.

Methods of managing the use of local and international volunteers need to be investigated.

# 17 People and Organizations consulted

### 17.1.1 Australian National University

Dr. Adrian Lowe
Senior Lecturer Materials Science

### 17.1.2 University of Canberra

Associate Prof Tracy Ireland
Director, Donald Horne Institute

Dr Elizabeth Bonshek
Assistant Professor
Museum Studies

Alison Wain
Tutor, formerly Head of Objects Conservation, Australian War Memorial

John Greenwood
Senior Lecturer Materials Conservation

Professor Dudley Creagh,
Professor of Materials Conservation

### 17.1.3 Melbourne University

Associate Professor Robyn Sloggett
Director, Centre for Cultural Materials Conservation

Sophie Lewincamp
Lecturer Materials Conservation

### 17.1.4 Australian War Memorial

John White Senior Curator Technology

Helen Creagh (retired, formerly Archivist, Australian War Memorial)

### 17.1.5 National Museum of Australia

Dr. Peter Stanley Head Center for Historical Research

### 17.1.6 Kokoda Treks and Trails

Frank Taylor

### 17.1.7 Movecorp

Susanna Wolmeke Crave Storage and movement specialists
Scraven@movecorp.com.au

John Douglas WW2 vehicle enthusiast and collector
douglasjohnv5@gmail.com

# 18 A listing of possible projects and institutional collaborations that the PNG National Museum and Art Gallery may wish to consider undertaking

# 19 Research PNG

Investigate open source databases suitable for the Museum and others in the region.
Measure the environmental corrosivity of the museum site and compare with data from WW2 sites.
Trial “green” corrosion inhibition for Aluminum in the exterior environment.
Trial “green” corrosion inhibition for steel in the exterior environment.
Development of a collections management plan in a Melanesian culture context.
More

ANNEX F

**Figure 20 Bunker interior - note good paint condition and loss of wood door surrounds.**

**Figure 21 Close up of door surrounds**

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**Figure 22 Chalk markings near gun mount.**

**Figure 23 Close up of builder’s marks**

**Figure 24 Plant damage to building**

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**Figure 25 Interior of main observation complex. Note that all wood has been eaten by white ants and rotted completely causing some losses where it was structural.**

## 20 Schwimmer Drome (14 Mile Drome, Laloki)

**Figure 26 1940 Chevrolet 30cwt**

**Figure 27 examining documentation with the owners**

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**Figure 28 Typical advanced corrosion of parts in line with calculations. This piece is actively corroding as the “red rust” indicates.**

**Figure 29 1940 Chevrolet 30cwt note lower parts missing due to corrosion from contact with moist dirt.**

**Figure 30 Anti Aircraft Site**

**Figure 31 Anti Aircraft Site - Fuel cans, filled with sand, used as reinforcement**

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**Figure 32 AA Site close up of corroded fuel cans used as reinforcements – note holes**

**Figure 33 AA Site Shell base**

**Figure 34 AA Site Chev engine valve side cover**

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**Figure 35 Survival of Food tube, engine gasket and horseshoes.**

**Figure 36 25 LBer at Owers Corner – note cover, concrete stand and axel stands to reduce corrosion.**

# 21 General Competencies

- **Communications**
  - Inter-cultural communication
  - Written, oral and non-verbal
  - Terminology / vocabulary

- **Environmentalism and its impact**
  - Conservation ethic
  - Environmental audits - compliance, energy, activities, issues
  - Environmental custodianship
  - Sustainable development practices

- **Evaluation methods**
  - Analysis of data
  - Data collection
  - Project design
  - Purpose
  - Report methods

- **Financial management**
  - Elementary numeracy
  - Basic analysis, monitoring, and reporting methods

- **Information Technology**
  - E-mail
  - Web sites

  - Multimedia formats
  - Database management

- **Interpersonal relationships**
  - Collaboration and networking
  - Disability awareness
  - Strategies for museums
  - Political considerations

- **Museums and society**
  - Accountability
  - Issues of identity and discrimination
  - Ethnic, racial, cultural and intellectual diversity
  - Knowledge of local, national, regional, international issues, resources and conditions
  - Promotion of peace and understanding amongst people
  - Public trust

- **Nature of work**
  - Administrative and management policies and practices
  - Affiliations with other organizations / consultancy / outsourcing
  - Multi-disciplinary environment
  - Quality maintenance of services and products

- **Professionalism**
  - Contributions to field
  - Continued education
  - Ethics and values
  - Personal
  - Specific to an individual museum and culture
  - Relative to discipline and occupation
  - Identity
  - Intellectual curiosity
  - Initiative, self motivation, self-evaluation, flexibility
  - Leadership
  - Organization of museum associations - local, regional, national, international
  - Self-management of career
  - Standard-setting
  - Recognition and integration of diversity into all processes
  - Recognition of excellence
  - Vision of and purpose for museums and personal role at individual institution

- **Project Management**
  - Delegation and review
  - Multi-disciplinary environment
  - Planning and organizing
  - Priority-setting
  - Problem-solving
  - Resource management, implementation and evaluation
  - Team processes

- **Research**
  - Ability to seek out and acquire new information, apply learning to tasks
  - Critical thinking

  - Methodology

- **Resources in the field**
  - Literature and information sources including bibliographies, directories and indexes
  - Professional associations: international, national, regional and local

## 22 Information and collections management and care competencies: knowledge of and skills in creating, preserving and sharing museum resources

It is essential that all staff are given targeted training in all facets of management of the collection.

- **Collections**
  - Access: cultural, physical and intellectual: visitation, tourism
  - Agents of deterioration: physical, chemical and biological factors
  - Automation: Computer software and hardware selection

  - Cataloguing
  - Collection issues
  - Collection management
  - Preventive care

  - Copies / reproductions / digitization
  - Copyright
  - Quality control
  - Development
  - Documentation / Data management
  - Generation, organization and care
  - Electronic / world wide web aspects
  - Environmental monitoring and control
  - Temperature, relative humidity, light and atmospheric pollutants

  - Handling
  - History and philosophy
  - Kinds of collections
  - Ancillary collections including audiovisuals, slides, negatives
  - Built environment including sites, landscapes, structures
  - Cultural heritage including oral history, folklife, language
  - Documents, manuscripts, archives
  - Objects, artworks, sculptures, specimens, prints

  - Packing and transporting
  - Pest management
  - Policies
  - Principles of conservation / restoration
  - Properties of materials, implications for preservation

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- Registration
- Accession
- De-accessioning
- Disposal Loans

- Resources
- Standards
- Storage
- Theft
- Use of (in):
- Natural and cultural contexts
- Exhibitions
- Public service role
- Research

- Library and information services
- Scientific activities
- Data collection, preparation and analysis
- Research design
- Phases of the research process
- Sampling procedures / survey tools / procedures

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