

Conservation Assessment of the Heritage Collections at Perth Observatory

**A report for the Perth Observatory
Volunteer Group Inc.**

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Perth Observatory from the Lowell dome

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Executive Summary

The Perth Observatory was inspected in January and February 2019 with a view to form an opinion of the conservation needs of the collection. It was noted that there are some significant opportunities for collection rationalisation in that there has been an accumulation of materials during the time of organisational change. With gradual diminution of staff there has been no resourcing for removal of excess materials that do not conform to the collections policy of the Perth Observatory Volunteer Group (POVG). This material represents an increased fire hazard and opportunities for pest infestation.

There is a vast collection of information on the celestial environment covering more than 120 years and this material is of international significance. The most valuable material is in fireproof safes and more of these have been ordered and into which less valuable resource material, including tapes, can be stored. A major reorganisation of historic records and files has commenced, and appropriate archival quality boxes and paper-based materials have been sourced for this work.

Measurement of the surface pH of many of the bound records and of the maps and plans and related documents in the plan cabinet are significantly acidic and action needs to be taken to move them into a less aggressive environment. The main exhibition centre is lit by incandescent and spotlights and overhead fluorescent tubes, somewhat filtered by the plastic diffuser covers. Measurements of the visible light levels (lux) and the ultraviolet light ($\mu\text{W}\cdot\text{cm}^{-2}$) have shown that there is far too much light for the safety of the objects on exhibition.

There is significant paint loss on the Grubb 1896 telescope barrel where accidental impact has removed significant sections of the lead-based paint from the instruments main tube. There is also paint loss to the supporting structures. The old paint should be removed using *Sponge Blasting* methodology which is excellent for capturing the lead paint and creating minimal dust and leaving the surface in excellent condition to receive a new set of white painted layers of protective covering.

In the Lowell telescope dome, there is a humidity problem that is causing corrosion failure (external) to some of the components of the instrument. It is understood that work is currently in progress to fix the rotation and opening mechanisms of the dome, but more care needs to be placed in managing the air quality inside the operational areas of the facility.

In the basement level there is significant rising damp on one of the external walls and this is damaging the fabric of the building.

A collection database system, Collections Mosaic, has been set up and currently 500 items have been catalogued. Completion of the cataloguing is a priority.

Key Recommendations

- Throughout the Observatory all the old fluorescent lights should be replaced by low UV emitting tubes. In addition, the old flood and spot lights should be replaced with modern dimmable low UV lights. A lighting plan for the exhibition areas should be developed.
- It is recommended that a breather space be created on the outside of the building and backfilled with crushed blue metal to allow the moisture to escape to the natural environment. This will stop the rising damp within a period of 12-18 months.
- Fitting of UV absorbing film to the windows in the library is an essential step in the preservation of the collected materials housed in that space.
- A review of the Draft Emergency Response Plan and customisation for the Perth Observatory site is part of an essential upgrade of collections management systems.
- An audit of the materials in the collection at the Bickley site should be conducted with a view to removing things like old catalogues but also rationalising the collection of old desktop and laptop computers to ensure that an adequate supply of the operating systems needed to run historically significant software is maintained. This culled collection could form the basis of future exhibitions to demonstrate how astronomers have adapted continuously to the changes in available technology.
- A program of preventive maintenance be developed for the most historically significant materials in the collection – see report by Johanna Sassoon. Funding and any additional support should be sourced to make the collection fully operational.
- It is recommended that in the archive store (Craig Bowers office) that freezer panels be attached to the window frames to reduce the heat flux coming into the room and that split air conditioning ducted air be sent through the adjacent walls into the room. If this is too impractical then fenestrations through the freezer panels can be effected. This will also eliminate UV light coming through the windows and provide some passive resistance to heat flux in the event of a spot fire.
- The feasibility of coating the roof of the building with a ceramic based insulating white coat of paint should be assessed as this has been demonstrated to reduce the energy loading needed for climate control by between 35-45%.
- It is recommended that funding from external agencies and sponsors be sought to set up an “adopt a telescope” to establish an effective cash flow to allow for extra work to be done on the collections of historic objects.
- It is also recommended that a set of temperature and relative humidity data loggers be purchased and installed in key locations within the main observatory complex and in key domes. This will facilitate the collection of microenvironmental data which will act as powerful tool for working out where it is best to apply the limited amount of funding for direct or passive environmental control.

Introduction

As part of the strategy to get recognition for the heritage value of the collections housed in the Perth Observatory site in the Darling Ranges at Bickley, the POVG applied for a National Library of Australia (NLA) for a significance documentation grant and in this they were successful in gaining the requisite support. Dr Johanna Sassoon was commissioned and produced a fine report in which several major recommendations were made.

One of the outcomes of this work was a raised awareness of the need to control the light levels in the main library wing, where many historically significant scientific volumes are housed, and so the POVG with the assistance of the Department of Biodiversity, Conservation and Attractions (DBCA) had a special set of blinds installed that have dramatically improved the light management issue in the library. The significance of the collections at Bickley were shown to have high value on an international scale as well as a national level. Owing to the continuity of the records of astronomical observations conducted through the same telescopes from 1896 to the present day. The combination of records on site at Bickley and the telescopes still being operational and in the same location, plus the computation records of determining positions and locations of celestial objects makes a compelling case for retention of all elements of this remarkable story. The collection also offers significant opportunity for the public to continue to engage with the working collection and to learn the historical background of operations and astronomy before the digital age changed the accessibility of data. It has been demonstrated that with collections, such as the volumes of *Nature* since it was established in 1876, only increases with time as more and more astronomical sites across Australia are shut down in response to another wave of economic rationalism.

The Significance Report also noted the extraordinary nature of the rare *Atlas Coelestis* (1729) volume and it is normally covered in its display case unless there is a visitor to the main gallery and the replica of the old Government Astronomers Office from the time when the Observatory was at Mt Eliza in Perth (Sassoon 2018). This item is one of the very few that have survived intact and it is vital that all care and attention is paid to its preservation. Part of the conservation assessment involved a review of the visible and ultra violet (UV) light levels in the exhibition areas for they are lit with historically inappropriate lights with mini tungsten incandescent spot lights and with fluorescent tubes which do not have UV filter on their sleeves. Although the plastic covers over the lights will absorb some of the UV it is the photochemical damage wrought by the short-wave radiation that promotes degradation of manmade and natural polymeric materials.

Part of the approach taken in the conservation assessment is to consider the needs of the items in terms of the time it will take to bring about effective stabilisation of the collection item. Because there is no complete data base from which the list of objects can be drawn, the assessment is somewhat haphazard but is strongly guided by the work of Sassoon. Given that the POVG is very limited with regards to funding conservation, some mechanism of determining where to allocate resources needs to be developed. Previous experience has shown that if the significance ranking (1-5, with 5 being the most significant, such as the Grubb 1896 telescope) is multiplied by the conservation needs, which is similarly ranked, then the matrix value of the product of the two variables determines where the funding priority should lie. This approach has been used to determine grant applications for textiles at New Norcia collections and for the Royal WA Historical Society textiles (MacLeod and Car 2016, 2018). Proof that this approach works for other collections has been demonstrated by Heritage Victoria in working out which of the many dozens of historic iron shipwrecks in Port Phillip Bay and Bass Strait should receive priority. The determination was conducted as a

blind study and the matrix correctly scored the two wrecks that were receiving the greatest attention and worked out the third priority (MacLeod and Harvey 2015).

Assessment Methodology

Accumulation of acidic residues is a primary indicator of the inherent reactivity of the substrates to undergo corrosion, if they are metallic, or undergo acid hydrolysis if they are made of natural or manmade polymers. One of the common components of timbers of all types and forms is that they contain acetylated terminal chains so that when they hydrolyse, i.e. react with water, the ester is broken down and free acetic acid is produced. For lead containing alloys this is a very serious issue, as white efflorescences of a lead acetate hydrate are formed. Unlike many other corrosion products on lead, such as sulphate and hydroxy carbonate, in the form of the minerals anglesite and hydrocerussite, these patinas do not result in passivation, but they do the reverse and accelerate the lead corrosion processes.

In the confines of the basement store some of the standard materials were tested for surface acidity. This work involves placing a flat-surface glass electrode (VWR brand) attached to a previously calibrated pH meter (Kensington Scientific model 220) on top of one drop of distilled water (approximately 0.04 ml) and waiting for the pH reading to reach a steady value. Once attained the data was manually recorded and the results are shown in Table 1

Table 1: Surface pH of materials in the basement store.

Object	pH ₁	pH ₂	pH ₃	pH ₄
Plate 2141 reduction documents	6.1 cover sheet	4.2 work sheet		
Archive Box of Requisition books	5.3 outer surface	4.8 booklet & cover	5.2 booklet & cover	
Journal 40 Observations 1931	4.7 leather binding	3.9 paper	3.6 paper	4.0 paper
Journal 1901	5.0 leather cover	3.7 paper	3.7 paper	3.5 paper

The temperature at which the pH was recorded is displayed on the digital face and the values reported are automatically temperature compensated. The store was a mild 22.9 °C and the mean external surface pH of all the items was 5.3 ± 0.6 and the mean internal sheet pH was 3.9 ± 0.6 , which is approximately 20 times more acidic than the external surface.

It was interesting to note that the Archive Boxes shown in Figure 1 were acidic on the outside of the main structural material (pH 5.3) and that the internal elements of the records had a slightly more acidic mean value of pH 5.0. It is important to remember that a difference of 0.3 in the pH means that the papers inside the Archive Box was twice as acidic as the container. This reflects the lower quality of the paper records inside the box but certainly the long-term storage of such information should be made with boxes that are properly neutral and that have some buffer capacity to absorb the acidity coming from the paper-based materials which form the Perth Observatory records.

It was noted that on many of the leather-bound journal records that self-adhesive orange and white *Dymo* tape labels have been attached. While this is a commendable documentation effort there appears to have been little consideration given to the adhesive.

As the polymers degrade in the poor storage condition, the acidic decay products will eat into the leather and damage the bindings. In the same process the labels will fall off, so it is imperative that an alternative archivally acceptable form of documentation be affixed to the leather spines shown in Figure 2. The upper shelf files shown in Figure 2 have one paper label (third volume from the left side) which are stable and the tenth issue from the left has a black and white *Dymo* label attached to it. As is the case with the plastic identification labels shown on the horizontal volumes in Figure 2, it is important to have a program of removing the tape labels before too much degradation takes place.



Figure 1: Archive boxes on storage racks



Figure 2: Leather bound sighting records

The image shown in Figure 3 illustrates the social and storage history of the files in the folder boxes. Inspection of the stains in the vicinity of the *Dymo* tape labels indicates that a starch-based glue had been used to stick paper labels on the files but that these had failed so they were re-badged with the plastic tape in the hope that this would provide a more lasting solution.



Figure 3: Free standing file folder boxes open storage



Figure 4: Miscellaneous materials

The arrangement of collection items shown in Figure 4 indicates that there is not a rigorous storage plan with like materials belonging in the same areas and that the materials are apparently not directly catalogued. In the event of an audit of the collections it would be very difficult for the volunteers at the Perth Observatory to be able to locate any specific item on the shelving system.

General collection areas in basement

The basement area consists of many rooms that were previously used for specific purposes when the Observatory was fully staffed. As staffing diminished and overall active supervision from the government department of which they were part continued to decline, the team of volunteers and astronomers adopted a “can do” policy and as they were highly skilled scientists and computationally gifted, nothing was thrown out. This was since with diminishing budgets they could not afford the luxury of removing old equipment which acted as a resource that could be periodically “mined” for components on an as-needs basis. Images of the collection areas are shown in Figures 5-8.



Figure 5: Miscellaneous printers & computers



Figure 6: Computers, software and disk media



Figure 7: Rubidium operational clock & storage



Figure 8: Old computers, catalogues & media

There is a significant fire risk associated with the accumulation of the out of date electronics catalogues. Old printed circuit board and electronic components of the computers and the volatilisation of the plasticisers in the equipment presents a potential health threat to any staff who might spend a prolonged period in these work spaces. There are several trip hazards in the basement collection areas. It should be noted that for future working area

rehabilitation programs that the large room shown in Figures 7 and 8 are inside a large and very effective Faraday cage, which shields the sensitive equipment from stray electromagnetic radiation.

Another management issue in the basement is the presence of rising damp on one of the external walls, which has active exfoliation of the plaster-based render (Figure 9). This fragmentary material has the inherent vice of being able to be moved into the air column and lodged into the internal spaces of the complex computing equipment located in this region of the basement.



Figure 9: External wall showing active exfoliation associated with rising damp.



Figure 10: Old data files and redundant equipment



Figure 11: Non-operational modified gear

One natural consequence of being the “forgotten end” of the bureaucratic chain is that the Observatory has a wide-ranging collection of redundant personal desk top computers with associated disk media that can no longer be read by modern electronic equipment. If staffing and fiscal resources were increased, it might be possible for the Perth Observatory team be able to offer data recovery from old systems that have been relocated into various government records management systems. Because most areas of government have had to be compliant with disposal schedules and because of general cut backs to the public sector there is a major risk of key knowledge elements being lost. The equipment at the Perth Observatory may be the last of the line defence against full loss of scientific data.

In addition to the collection materials described above, there exists a well-equipped workshop with milling machines, lathes, welding (electric arc and oxy-acetylene) facilities and a range of machines for creating fine finishes in metal and in wood. This is a very important component in the materials conservation plan for the site for the bespoke nature of astronomical instruments means that spare parts for the 19th century telescopes are non-existent and must be made on site. To purchase such rare parts on the market would be prohibitively expensive so it is imperative in any future planning of the Perth Observatory that the workshop continue to be maintained in an operational condition.

Collection storage areas on the ground floor

The second major storage area was in the ground floor complex of rooms associated with the plate processing dark rooms. The critical part of the plate collection is housed in two fire proof safes and the primary images are housed in mylar sleeves. The sleeves are housed in numbered order in a series of small storage boxes to minimise the chances of accidental damage and to avoid heavy handling loads, which would raise significantly the risk of accidental dropping at the end of a long day of work.



Figure 12: External view of a Fire Proof safe



Figure 13: Opened safe showing mylar sleeved plates

There are significant amounts of the plate collection which are housed in labelled envelopes which are not archival quality, which was attested by the pH measurements shown below in Table 2.

Table 2: Surface pH measurements for plates in the storage area

Location and description	pH ₁	pH ₂
Mylar cover on primary plate Scope A 40-1890 Sept 11 NCC 6475	6.7	6.8
brass instrument 2014-71 a, b	5.8 coated box	5.0 bare timber
plate 0206445-1950	3.8 OHMS cover	
plate envelopes 17710-1978	4.8 Perth Observatory	
loose negative end	5.2 no acid fumes	
Observatory plan ex time capsule	5.6	see Figure 18
Acid free tissue in plan cabinet	4.7	
TC 2013.54 list of contents	4.4	
Time capsule Newspaper	4.3	

From the pH data listed in Table 2 the mylar sleeves holding the precious developed plate images are neutral as they are slightly more alkaline than the pH of CO₂ saturated distilled water. However, the situation is not good as far as the other paper-based storage envelopes are concerned. It is noted that the covers and paper items inside the plan cabinet had a mean pH of 4.7 ± 0.6. As previously discussed, the principal cause of the acidity is from the breakdown of acetylated residues in the wood pulp used in the manufacture of the paper. The pK_a, the negative of the log of the acidity constant K_a, for acetic acid (ethanoic acid) is 4.74 and at this pH 50% of the acetic acid is present in the undissociated form and 50% is present as the acetate ion. This means that the papers in the plan cabinet are as acidic as vinegar used in traditional meals of “fish and chips”. This represents a major risk to the longevity of materials housed in these environments. The most acidic piece of paper tested was the OHMS plate envelope which had a pH of 3.8, which is ten times more acidic than the mean of the other materials. A priority response should be given to replacing the very acidic OHMS envelopes and to conserve through treatment the documents contained in the time capsule that was opened when the Observatory moved from its former location in West Perth to the Bickley site.

It was also noted that the acid free tissue paper in the plan cabinet had absorbed the acetic acid vapours from off-gassing materials and should be replaced with buffered acid free tissue paper as a very high priority. One of the collection items randomly chosen was an astronomical instrument laying down inside a felt-lined lacquered wooden box, as shown in Figure 14 and 15. The coated timber had a less acidic (pH 5.8) surface than the bare timber at the base of the container (pH 5.0). It was noted that there is localised decay along the old brush strokes of the lacquered brass instrument, and this is due to the acetic acid fumes attacking the metal in areas where there is less protection of the underlying alloy. This acidity could be managed by placing an open container of sodium carbonate on a petri dish inside the box to absorb the acetic acid vapours as a temporary holding measure until the object can be treated by a conservator. The treatment would involve the removal of the residues of the old lacquer on the brass and then remove the corrosion products and polish the metal back to a lustrous surface, if possible. The instrument could then be placed inside an *Intercept* bag which will protect it from corrosion attack by the timber and its degradation products.



Figure 14: 2014-71 a, b instrument out of case



Figure 15: Breakdown of lacquer & corrosion

During the inspection of the wooden cabinets, with the massive sliding doors that interleave and provide a significant trapping hazard for fingers, a film cannister was opened to check for any acetic acid vapours (from the cellulose acetate film support medium) or of nitric acid if the film images had been done on old cellulose nitrate film. Happily, there were not any acidic fumes found. A sample of the end of the film roll which was fully exposed was checked for acidity and the pH of 5.2 does not reflect a major acidity problem. However, an indication of the storage medium and its inherent aggressive nature for metallic objects is shown in Figures 16 and 17.



Figure 16: Film cannister showing tin corrosion on unprotected surfaces.



Figure 17: Breakdown on cannister showing grey & white tin corrosion products and loss of label.

Where the lid had overlapped the tin of "Meteors and Meteorites" images there was no corrosion of the tinned iron. In addition, the old nitrocellulose tape used to hold the identity

tag in place has totally failed and needs to be replaced with an archivally stable label and attached to the tin containing the exposed and developed film record.



Figure 18: Old document in plan cabinet drawer with heavily gummed and degraded tape

Although the pH of the plan shown in Figure 18 was only 5.6 the primary cause of greatest concern is the liberal application of a heavy adhesive based tape to hold the torn document together before it was placed into the plan cabinet, along with other time capsule documents. The pH assessment was done on the clear paper just above the *Copy of P.W.D W.A.* stamp and no attempt was made to check on the tape residues. Experience has shown that the removal of the tape and the residues from the plan of the Old Observatory is something that requires the skills of a specialist paper conservator with the work carried out in a fume hood in an appropriately kitted out laboratory. The treatment of this plan no 4396 should be given a high priority.

It was noted that in the Archive and History room some freshly supplied archive boxes from the Art and Archival supply company did indeed have a neutral pH of 7.0 and that the new archival quality paper had an invariant set of three readings which recorded a value of pH at 7.6. By way of contrast the record cover file in a standard four-drawer metal filing cabinet from 1931 had a pH of 5.4 which was significantly less acidic than the more modern file from 1995 which had a mean pH of 4.4 ± 0.5 . The difference of one pH unit means that the more modern paper documents are ten times more acidic and this is due to the poor quality of the starting materials. Once the historic records documents have been appropriately sorted and catalogued and an accessible data base has been established, it should become an organisational objective to move the old files into less acidic folders. It should be noted from the example given above, that just because the files and folders are older does not mean that they are going to be inherently more acidic, in fact the reverse argument can often be applied.

The light levels in this office were recorded on the morning of 5th February and were 82 lux against the external wall facing venetian blind and the ultra violet light was recorded at 12

$\mu\text{W}\cdot\text{cm}^{-2}$. In contrast the general office area, where the archive box files are now stored was 100 lux and $3 \mu\text{W}\cdot\text{cm}^{-2}$, which illustrates the background light levels from the office fluorescents tubes but some of the UV light is being absorbed by the plastic diffusers and making the light less destructive.

The Library

Without a doubt the collections in the library of the Perth Observatory are something attested the highest level of National Significance (Sassoon 2018). In response to a major recommendation in the Significance Assessment the POVG installed an operable blind system that would prevent the afternoon sun blasting into the library space and damaging the books and the bindings with exposure to intense UV light. It is ironic that part of the collection of very high significance, that relates to night-time observations, is very sensitive to exposure from sunlight. An example of how localised exposure in an office can rapidly degrade the natural dyes used in the vegetable tanned leather bindings is seen in Figure 19.

Light levels were taken at 09:30 against the screened window 82 lux and $4 \mu\text{W}\cdot\text{cm}^{-2}$ which was much less than the overall light levels at the reference reading book level of 200 lux and $3 \mu\text{W}\cdot\text{cm}^{-2}$. It is recommended that the fluorescent lights be replaced in the library with tubes that are low UV emitting.

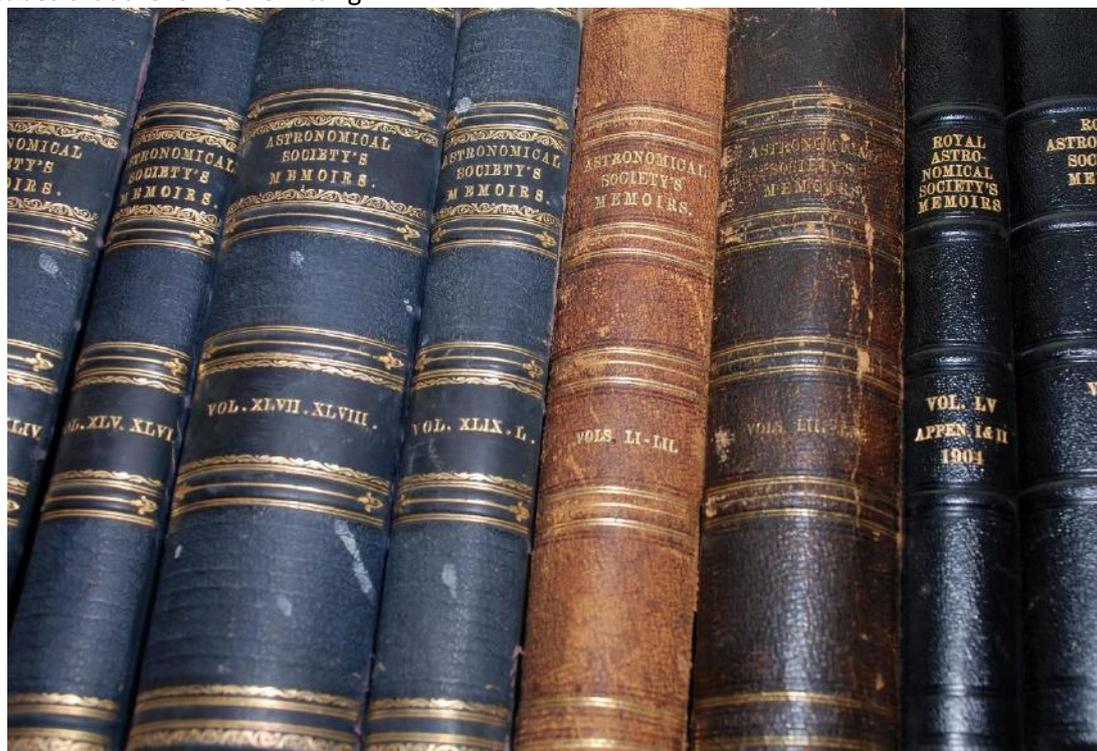


Figure 19: Leather bound volumes of the *Astronomical Society Memoirs* illustrating photodegradation

The first five volumes are a medium blue and the sixth volume (LI-LII) is pale brown, while the seventh volume from the left (LIII-LIV) is mid to dark brown. The final volumes for 1904 and 1906 are deep blue. It may be that library records will show that the latest volumes in the above image may have been rebound at some stage, but the very significant fading of the middle volume is a characteristic of UV light damage on leather bindings. It is likely that the specific volume that has suffered the most photodegradation was stored in an astronomer's working office or sat on a bookcase and was exposed each day to sunlight.

Similar light-fading has been observed on a domestic leather-bound volume of Keats poems in a Victorian beach environment over a period of 20 years.



Figure 20: *Nature* issues from Volume 1 1869

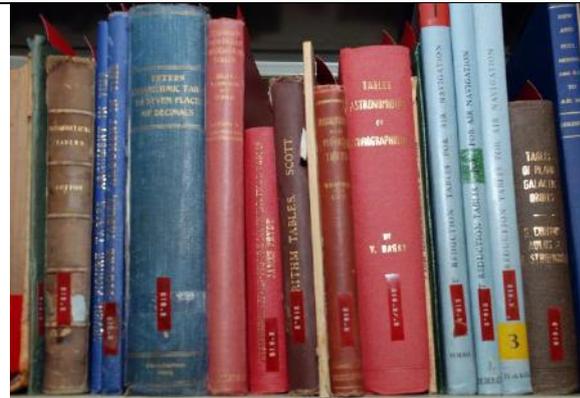


Figure 21: Catalogue labels in *Dymo* need replacing

Of great scientific interest is the collection of the most prestigious journal *Nature* from its first issue in November 1869 up until the present time. As more and more scientific libraries are closed and the contents disbursed this asset of special journals is rapidly becoming even more significant and, as such, is a great gem in the collection. Whilst it is readily apparent that there is a very large collection of plate images of the stars, comets, planets and associated astronomical phenomena it needs to be recognised that many of these images are unique records of alignments and events that can never be repeated and that despite the extraordinary advances in radio astronomy, there is still a great deal that can be learned from the collections housed in the Observatory at Bickley. It was a sad comment on the ubiquitous nature of applying *Dymo tape* labels to historic items and library books in the 1970's that major parts of the collection in the Observatory library have been impacted (see Figure 21). All these labels need to be removed, the acidic adhesive left behind on the spines chemically removed and alternative archivally stable accession numbers and catalogue numbers need to be affixed.



Figure 22: New printed labels on leather bound records of plates & already some are gone

The examples of labelling half done is seen in Figure 22 where two of the uppermost new labels, which covered the damaged areas of the spines where previous documentation had been placed, are already lost. Advice from the conservators at the State Library of WA should be able to satisfactorily resolve the best way through this apparent documentation dilemma.

The telescope collection: conservation management issues

There are seven significant telescopes in the Perth Observatory collection, dating back to the 1896 13" Grubb Astrographic instrument and it is housed in its original dome that was relocated to the present site in 1966. During our inspection, it was noted that the surface of the scope was significantly in need of attention, as there were significant areas of the main tube that had lost the white lead-based enamel gloss paint coating, as illustrated in Figure 23. Given that the telescope needs to be kept operational it had been proposed to use chemical stripping agents to remove the toxic lead paint and to then clean the metal and coat it with the standard systems applied to historic telescopes that are compliant with current OSH standards.



Figure 23: Grubb 1896 telescope showing paint loss on the main tube surfaces

A conservation option that is newly available is to use Sponge Blasting, in which sponge rubber fragments are fired at the surface and the paint comes away. Part of the mechanism involves the embedding of blasting media, of specified hardness, into the sponge rubber. The principal is that when the paint film "feels" force of the sponge medium it exerts an equal and opposite force to resist and because the sponge has moved away the paint film disbands. This process produces a product that is 93% recyclable and creates much less mess and contains the toxic materials. It has been used to clean aluminium alloy aircraft skins of paint, for which the method was developed, and can be applied to stone and alabaster. Commercial Sponge Blaster operators exist in the Perth metropolitan area and they should be contacted to provide a quote for the work. This "new" method would avoid damage to the historically significant main tube and all the associated ancillary equipment.

The **Transit (Meridian) 1896 telescope** in the foyer of the Observatory is in no need of conservation work as it has been only relatively recently fully restored to operational order. A grant from the National Science Foundation of America provided funds for its restoration in the 1960's and it is maintained by volunteer members of the Perth Observatory Group. Also noted in the foyer area was a hand-held telescope inside a glass and anodized aluminium exhibition case. This instrument needs conservation work as the main tubes are showing signs of differential aeration corrosion due to the breakdown of the lacquer coating, as seen in Figure 24. A brass pan balance in the same showcase is also in need of conservation work as the pans are corroded due to the dust accumulation providing condensation nuclei for dew formation during the cold winter months.



Figure 24: Sighting telescope showing significant brass corrosion on the main tube.

Perth Lowell Automated 24" Telescope (PLAT) is housed in its purpose-built dome on top of a 15-metre platform resting on a series of reinforced concrete pillars and was installed in 1971. The telescope was provided by the Lowell Observatory from Flagstaff USA using funds from a NASA grant. It played a major role in mapping of the planets and was part of the instruments that determined the nature of rings around Uranus. It was the first in the generations of automated telescopes in Australia and utilised an astronomical CCD camera which was the first one developed and utilised in Western Australia. Owing to leaks in the dome, which was under designed for the weight, an excess moisture content develops inside the dome and this has led to localised corrosion problems on some of the operational fixtures. At present, work is being done to replace the old dome bearings with roller bearings designed to fit the purpose and load. After completion of these works it is planned to bring the telescope back to operational order. An overall view of the Lowell telescope is seen in Figure 25 and the detail of the opening plaque is shown in Figure 26. It was noted that the high moisture content inside the dome had led to iron corrosion, through the chrome plated layer on a fan guard on the scope and a red-brown deposit on one of the tubes, which is most likely finely divided cuprite (Cu_2O) which needs to be removed by buffing with a mild abrasive such as Beckett's Burnishing Wax, which contains cubic zirconia crystals which have rounded edges so they do not leave scratch marks on soft non-ferrous metal alloys.

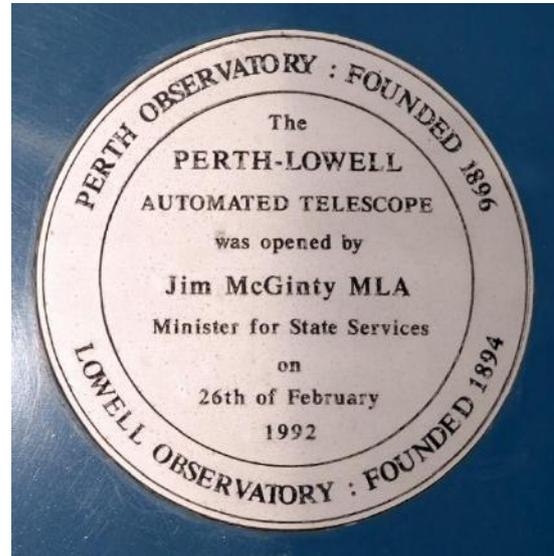


Figure 25: Lowell 24" telescope in raised position, awaiting dome repairs.

Figure 26: Memorial plaque inside dome.

The RCOP telescope is housed in a small shed with an operable roof and is made available through an on-line system for searching the skies for materials of interest. A view of the telescope is seen in Figure 27. One corrective measure needed is improved maintenance on the “dome” sliding roof structure which is prone to leaking. Excess moisture in a storage environment inevitably leads to greater decay rates for all metallic elements so funds spent in correcting leakages will prevent much greater restoration costs in the future years. There is some paint delamination from the sliding sections that interleave during the opening operation modes and this area needs some maintenance attention. The plastic hood in front of the lens is a temporary structure to cope with periodic entry of rain during open operations. The use of an old classroom desk to house equipment is an innovative and cheap response to years of diminishing budget. Without the extraordinary commitment of the staff and volunteers this remarkable facility, and the public access to the same, would have long since passed its use by date and for this all involved are to be commended for their dedicated efforts.



Figure 27: RCOP Telescope: roof needs attention for leaks

Exhibition gallery light levels

On the main floor there is a large exhibitions area which accommodates various pieces of celestial themed artworks, many of which are original, and a facsimile of the Astronomer's office from the Mt Eliza site. There was a concern expressed by members of the Volunteer group that the light levels from the old fluorescent tubes and the spot lights might be too intense as some significant fading of one of the time capsule stamps. These stamps are subjected to light exposure every time the display area is accessed as it has not external windows and artificial lighting is needed in order to view the collection. Of significance to this collection is the *Atlas Coelestis* (1729) which was donated by a direct descendant of Flamsteed, a water colour of whom sits below the object. A small watercolour of Capel Loft,

who made the original annotations on the Atlas, is similarly displayed. The light levels are shown in Table 3. The data was read from an AccuPRO XP-2000 meter calibrated Nov 2018.

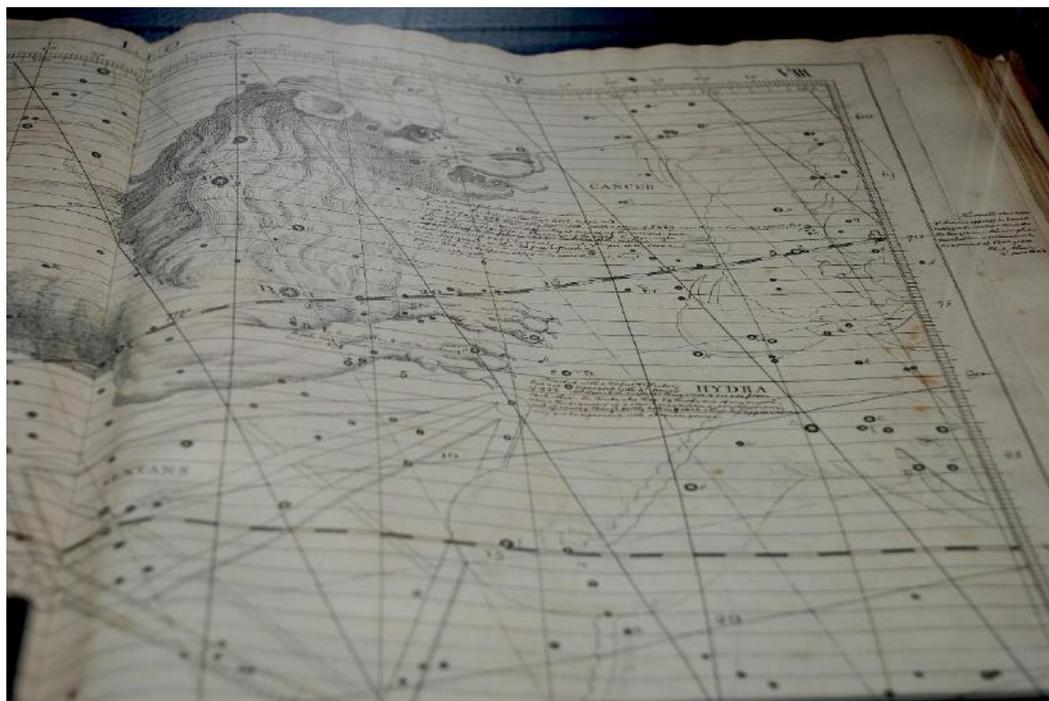


Figure 28: *Atlas Coelestis* (1729) on exhibition in the main gallery.

Table 3: Visible and ultraviolet (UV) light levels Feb 5th, 2019 09:00-09:45

Location and description incident at surface	Lux	UV $\mu\text{W}/\text{cm}^2$
Horse nebulae painting	410	5
Desk level beneath Horse nebulae painting	400	3
At the covered <i>Atlas Coelestis</i> surface	248	3
At the covered <i>Atlas Coelestis</i> surface – no spotlights	180	4
At the covered <i>Atlas Coelestis</i> surface – full fluorescent	200	4
Flamsteed water colour	320	4
Capel Loft water colour	310	2
Comet large painting	350	4
Newspaper of first person on moon cutting	550	8
Asteroid 552 Moffatt certificate (painted)	860	5
Asteroid Flamsteed certificate (painted)	950	6
Faded time capsule stamp at outside Perspex case	220	4
Print of drawing of Fremantle time ball - top	1750	6
Print of drawing of Fremantle time ball – bottom	700	4
Shortt-Synchronome	260 front 924 top	2 front 4 top
1879 Johnstone star glob	400	3
Star globe in case	450	2
Far wall painted image of ringed planet	300	3
False colour transparencies of nebulae back lit	15	3

In order to gauge how the light levels varied over large exhibition objects a series of measurements were taken at the left-hand side, the middle and the right-hand side of a

series of mounted astronomy photos, and the data shown in Table 4 shows how significant the variations are in the light intensity.

Table 4: Variations in light on a series of astronomical photographs on exhibition

	Left hand side	Middle	Right hand side
Top	570 lux & 2 $\mu\text{W}/\text{cm}^2$	400 lux & 3 $\mu\text{W}/\text{cm}^2$	1,150 lux & 6 $\mu\text{W}/\text{cm}^2$
Foot	370 lux & 2 $\mu\text{W}/\text{cm}^2$	320 lux & 3 $\mu\text{W}/\text{cm}^2$	280 lux & 3 $\mu\text{W}/\text{cm}^2$

Although the light levels recommended by institutions can vary according to microfadometer tests on actual specimens and the constituent inks in the images, the current exhibition conditions for loans in museum exhibition galleries are

- 50 lux for costumes, textiles, fur, feathers, dyed leather, drawings, water colours, stamps, transparencies etc.
- 200 lux for oil & tempera paintings, lacquer ware, plastics, wood, furniture, horn, ivory, minerals and modern black and white photographs
- 300 lux for stone, glass, metals and ceramics

Details of the discussions on light levels in museums are well documented and found at the URL below:

<https://www.museumsgalleriesscotland.org.uk/advice/collections/conservation-and-lighting/>

The most compelling observation is that the main exhibition gallery needs urgent attention and a grant should be obtained to get appropriate lights and floodlights installed that have very low UV component and are dimmable to allow for appropriate light levels to be adjusted for the historic artefacts. Even when the *Atlas Coelestis* (1729) is uncovered it is receiving five times the recommended amount of light. Although the mock-up of the Astronomer's office was not directly accessible it was clearly discerned that there was fading on the original volumes which are on exhibition, including Volume 1 of *Nature* and this is placing the collection at a serious level of risk.

Conservation prioritisation and costs of treatment programs

Previous experience with the textile collections at the Benedictine community in New Norcia (Western Australia), with the textiles in the Royal WA Historical Society and with the collection of historic iron shipwrecks in Port Phillip Bay and Bass Strait (Heritage Victoria) has shown that a treatment priority program can be developed using the product of the Significance and Conservation rankings. The objects with the highest score are the ones most in need of attention either by virtue of their national significance or their specific conservation requirements. For the collections at Perth Observatory it should be possible to assign collection items to a priority listing of between 1 and 5, with 5 being the materials. For example, the Grubb 1896 telescope with significant damage to the paint work on the main tube would be assigned a number 5, for without this work and timely intervention that historic tube will corrode and then the impact on the potential loss of access to the instrument and its optics would be grievous. This data can then be used in conjunction with the significance rankings produced by Johanna Sassoon, through her listing of the most significant objects in the collection. The most efficient way to determine the treatment priority for the collection is to establish a supplementary grant to allow Johanna Sassoon to use her notes and data on the collection to produce a numerical listing, graded 1-5, of the

most important items in the collection. Thus, for the Grubb telescope its original dome would have a treatment priority ranking of 25 out of a possible 25. A similar process can be worked through for the other significant scientific instruments listed in the significance report.

Thus, the objects most in need of attention, and thus the most likely subjects for a specific grant application to the Lotteries Commission or to other granting bodies, will have the highest score of 25 then 20 then 16 etc. using the multiples of the downward steps in the ranking of conservation needs and significance values. An outline of how the conservation needs can be assessed is given below:

Category 1: repacking storage medium with acid free tissue, photographic documentation and storage in appropriate archival box. Record a registration number into the database.

Category 2: requires custom response for supports, specialised storage, surface cleaning with vacuum or dry solvent cleaning, objects are in generally reasonable condition. Place objects in an *Intercept* bag to protect from future corrosion.

Category 3: significant corrosion of metallic surfaces, requires possible treatment with burnishing wax &/or recoating with historic instrument varnish, OR Significant degradation of observation records, needs custom box made and removal of old labels and repairs of spine.

Category 4: Books and journals need rebinding, work cannot be done by trained volunteers but needs attention of a professional book binder/paper conservator, OR Metallic objects have significant corrosion issues and need customised treatments to effect stabilisation.

Category 5: Collection item is severely degraded and needs to undergo intensive treatment to stabilise and consolidate. This work will need the attention of an expert practitioner in the relevant field of materials conservation or corrosion prevention.

It is the view of this consultant that level 1 and level 2 conservation works can be conducted by experienced volunteer staff after customised training has been given by an experienced conservator or collection manager. A level 3 conservation job would require the skills of an experienced technician familiar with operational equipment of the observatory. A level 4 conservation job could be done by an experienced graduate in materials conservation and a level 5 job would require a knowledge of research, development and application of materials conservation.

Table 4: Number of hours and costs associated with conservation treatments

Conservation ranking	1	2	3	4	5
Hours	1.5	4	17	38	118
Unit cost	\$ 195	\$ 520	\$ 2,210	\$ 4,940	\$15,340

The costs listed in Table 4 are for a contract conservator working at \$130 per hour. When the number of conservation treatment hours per object is plotted against the conservation ranking the data shows a dramatic rise as the degree of difficulty of stabilising the artefacts increases. The hours and the conservation needs were linearised by plotting the logarithm of the number of hours as the ordinate scale,

$$\log_{\text{hours}} = -0.2987 + 0.4769 \text{ CR} \dots\dots\dots(1)$$

The linear regression analysis for the logarithmic plot had an R² value of 0.9941 which gives a very high degree of confidence in the fit of the data to a straight line, since a perfect fit

would have an R^2 value of one. The resultant regression equation allows the cost of treatment for groups of objects to be calculated for the situation when, after statistical analysis, the conservation ranking (CR) has fractional values. For example, the conservation ranking of the bound volumes of records of the observatory may receive an average CR value of 2.7 ± 0.4 . Thus, the unit cost for treatment of this group of objects is calculated,

$$\text{\$ cost} = 10^{(2.7 \times 0.4769 - 0.2987)} \times 130 = \text{\$1,267}$$

Through similar calculations it is possible to work through the collection items and their conservation rankings to establish the unit cost for each group of items and then work through the data on an iterative basis to determine the theoretical cost of treating the most significant items or the whole of the collection, in an ideal world.

Building and Environmental Survey

At the time of the inspection there was no data available on the general conditions in the main collection areas on the ground floor. During a subsequent visit to the site to conduct direct measurements of the UV and visible light levels in the main areas, a single RH and Temperature data logger was commissioned on the site and after six months of data recording the information will be downloaded and an addendum to this report will be issued which covers the logged period of activity in the storage area.

Housekeeping and visitation

There are significant opportunities for a collection rationalisation process to be managed over the coming months and years. During the assessment process the hoarding of old materials, because they may come in handy one day, was shown to be an area of concern as it led to an accumulation of paper-based materials which are a fire hazard, and which would lead to an increased fuel loading on the collections building in the event of a fire or a bushfire.

In determining the materials for site removal due consideration should be given of the collection value of historic data collection and management systems for the richness of the Perth Observatory collections lies in part with this remarkable and vast collection of items spanning from the late nineteenth to the early 21st century.

There are many personal computers in the collection that are still operational, along with their diskettes, and they form the potential to develop a series of exhibitions about the changing nature of technology in mapping the skies and the movement of celestial objects. The Western Australian Museum technology section in the History Department has examples of such materials but there is not the breadth and depth of the collection as held by the Perth Observatory.

The buildings are well maintained, in as much as is possible with one groundsman, who also makes missing components for instrumentation in the mechanical workshop which is housed in the basement. The resident caretaker/maintenance lives on site and so provides excellent security against the ever-present risk of vandalism and unwanted activities by disaffected youth.

With visitation to the site being recorded at approximately $10,350 \pm 250$ per annum the number of visitors is typical of a small community-based museum in Western Australia. Although the services provided by the Western Australian Museum for this sector have been reduced in recent years, owing to the general impact of lower budgets and redundancies, some assistance is available in the areas of collection management. Membership of

Museums Australia also provides an alternative engagement avenue as does the association with other observatories in Australia and New Zealand.

Disaster Preparedness Planning Committee:

There is currently no form of Disaster Management Plan and it is recommended that a generic draft plan be adopted as a model and that the specifics can be added to it that encapsulate the specific risks to the collection at the Bickley site. The draft Disaster Plan is attached as Appendix II and this document just needs the addition of the local response teams and membership of groups who will form the core of the response team.

Collections Management

It has been previously noted that there are no complete or comprehensive collections management system and that large parts of information pertaining to the collection resides in the collective consciousness of former staff workers, many of whom now function as honorary staff and undertake their former duties. This work is indeed highly commendable but the allocation of a grant to specifically improve the way in which the records of the collection and the observatory are managed will significantly reduce the risk to the collections. At present Dr Craig Bowers, a former astronomer and Information Technology director, is consolidating the records of the Observatory and is undertaking a thorough audit of the important historic material. Ideally if funding were able to be obtained to allow other key members to continue this work at an increased pace, the level of risk of losing valuable information that adds enormously to the value of the collection, will be greatly reduced. All the volunteers and collection and site management personnel are doing a remarkable job under very adverse conditions. It is hoped that this report can be used as a collection management tool to apply to various foundations for specific funds to be allocated to the preservation and interpretation of the most historic telescopes and that funds be allocated for replacement of the lighting system in the main exhibition areas to comply with contemporary standards of museum quality lighting.

Training needs

It is essential that all the volunteers and the paid staff are given appropriate support to have all the key members trained in First Aid and Disaster Preparedness so that when an emergency happens the potential for negative impact on the site and the collections is greatly reduced. It is the opinion of the author that if appropriate resources are given to the institution it will be able to utilise the existing suite of skills to significantly improve the overall collection management at the Bickley site. Advice from a relevant Observatory collection, such as the Lowell Observatory, could be an effective way forward. To obtain generic collections management training and skills from a person with a standard museum suite of skills could possibly have a very positive impact on the longevity and the usefulness of the collection. It is hoped that a grant from the NASA or the USA Consulate in Canberra or from the Australian Academy of Science will be able to boost the Perth Observatory team and give them the support they need to allow them to properly manage their collection and to provide improved public access and public programs. This would ultimately provide significant political pressure from happy clients to have the funding and management model of the Perth Observatory reviewed with the aim of integrating the historical astronomy, using photographic plates of celestial objects, with the model radio telescopes at the Square Kilometre Array in the Murchison. Thus the 19th and 21st centuries can be integrated and visitors, both real and virtual, will come to know more of the remarkable contribution the Perth Observatory has made to science.

Authors biographical notes

Ian Donald MacLeod has 40 years' experience in conserving and managing museum collections. He pioneered the application of in-situ corrosion studies on historic shipwrecks and developed the methods for preserving historic wreck materials on the sea bed. He has published extensively and has applied micrometeorological methods to the study of the interaction of rock art with the natural environment. He has used this approach to determine the factors controlling the rates of deterioration of cultural materials that include composite metal and textile objects. He has applied micrometeorological studies to determine optimisation of buildings for storage of heritage collections in community-based museums and collection centres. He is a Fellow of the Australian Academy of Technological Sciences and Engineering, of the Royal Australian Chemical Institute, the Royal Society of Chemistry, the International Institute of Conservation of Historic and Artistic Works and of the Society of Antiquaries of Scotland. He is an accredited and life member of the Australian Institute for Cultural Materials.

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Appendix I: Perth Observatory Heritage Objects Collection Policy

Introduction

This document is to guide members of the Perth Observatory Volunteer Group (POVG) on the management and development of the collection of heritage objects. It outlines why, what, where, how and when the Perth Observatory collects, and how and why items may be de-accessioned and disposed of.

POVG has a ten-year (2016-2026) Service Agreement with the Department of Parks and Wildlife (DPaW) to among other things “Curate the identified heritage items and continue to identify and catalogue unassessed historical items”

The POVG Heritage Sub-Program is the implementation of the above responsibility and this policy guides the implementation of the Heritage Sub-Program.

The collection of Observatory heritage objects is a source of knowledge, ideas and memories of astronomy at the Perth Observatory, in Western Australia outside of the Perth Observatory and in the rest of Australia and the world. It is developed and managed as a state resource to educate and inform visitors and to contribute to the conservation of Australia’s astronomy history.

History of Perth Observatory

A proposal for the Perth Observatory was first introduced into State Parliament by the then Premier, John Forrest, in 1891, however, it failed to get financial backing. Forrest persisted with the scheme and funding was finally approved in 1895, along with funding for the Mint and the Museum.

The South Australian Government Astronomer, Charles Todd, provided specifications for the buildings and instruments required for the Observatory and recommended appointment of his assistant, Mr W. E. Cooke, for the position of Government Astronomer. The site selected for the Observatory was the playground of the High school on Mount Eliza, above the Barracks.

Plans for the Observatory buildings were drawn up by officers of the Colonial Architect’s Department (the folio of plans signed by Colonial Architect and the then Premier, John Forrest, are part of the heritage collection) and the contract let for the main building at a cost of £6,622.19s. Cooke was appointed Government Astronomer in early 1896, the foundation stone for the Observatory administration building and Government Astronomers house was laid on 29 September 1896 but it and the two domes were not finished until the end of 1897.

The Observatory’s early tasks included keeping accurate time, recording and forecasting weather and carrying out astronomical research. The Observatory developed a time service that linked the Observatory to a state-wide network providing regular time signals to shipping and the railways. Weather recordings were collated and published as annual meteorological reports as well as forecasts distributed.

In the field of surveying the Government Astronomer established the exact latitude and longitude for the Observatory in 1899 and for the main trig stations of the State surveying system. He developed a new method of calculating latitude and longitude using the standard surveying theodolite. The centre of the Transit Circle mounting was connected to the State triangulations system and adopted as the origin of Western Australian Surveys.

The observatory operated on the Mount Eliza site until 1963 when the State’s desire to use the area for Government office accommodation and deteriorating light conditions dictated a need to relocate. The site chosen was at Bickley and the move accomplished in 1966. The Observatory reopened in 1966 and continued, albeit in gradual decline, until 2015 when Government ceased active involvement but entered into a community partnership with the POVG to run the Observatory as an outreach and education service.

Purpose and Significance of the Collection

The purpose of the heritage program at the Observatory is to collect, preserve, study, interpret and exhibit items associated with the history of astronomy with emphasis on its history in Western Australia. Interpretation and display of collected items will be used to inform and educate the community to understand and appreciate the history, heritage value and contribution astronomy in Western Australia has made to the development of astronomical science and the State of Western Australia. The current Observatory at Bickley are a collection of late 20th century international style buildings mainly constructed in the early to mid-1960s to accommodate the staff and equipment moved from the Mount Eliza site, with a large addition in the early 1970s and some smaller public observation facilities later. The buildings include:

- Administration building (1964)
- Transit/Meridian dome (1964)
- Astrographic dome (1964-66)
- University dome (1964)
- Caretakers cottage (1965)
- 24" dome (1971)
- Celestron dome (1980)
- Visitor Observing Facility (1992)
- Millennium dome (2000)

The Heritage Council of Western Australia permanently entered the Perth Observatory complex of buildings onto the Register of Heritage Places on 19 July 2005.

The collection of heritage objects is significant because they are linked to the social and economic development of the State, particularly with respect to the introduction of standard time and accuracy in surveying.

Key Themes of the Collection

The scope of the collection is the functioning and development of astronomy and astronomical services. The themes for the collection of heritage objects are:

Astronomical services

- Time service
- Weather forecasting
- Surveying
- Seismology
- Tide measurement

Astronomy

- Buildings used in astronomy
- Instruments used to make astronomical observations
- Documentation of astronomical observations

The collection is made up of objects, books, instruments, photographs and documents.

Policies

In managing its heritage collection, the Observatory will in general use as a guide the National Standards for Australian Museums and Galleries Version 1.0. However, its specific policies are set out below.

Acquisition policies and criteria

Most items in the heritage collection are the property of the Observatory and have been used at the Observatory over its working life. The acquisition of new objects is not expected to be a significant activity.

Policies to be applied in the acquisition of objects are:

- New acquisitions need to be
 - relevant to the Observatory heritage program statement of purpose and collection themes
 - significant for its historic or scientific value
 - of a known provenance
 - in a good physical condition. The Observatory does not want to accept significant liabilities
- New items will only be acquired if they can be properly stored, documented and managed.
- The Observatory will ensure the donor or vendor of an object has clear legal title before it acquires an object from them.
- No objects will be accepted with conditions on the way they may be used or displayed in the future.
- All potential new acquisitions will be assessed considering the scope and content of the Observatory's collection.

Collection assessment and management policies

The Observatory collection is largely made up of items used at the Observatory over its life that have not been catalogued or assessed for significance.

Policies to be applied in the assessment and management of the collection are:

- Accurate, up to date and detailed records of all objects in the collection will be kept.
- Object files will be kept for the most significant items.
- A 'Statement of Significance' will be prepared for the objects in the collection. The Statements will be prepared on a priority basis.
- The Observatory will annually identify priority themes as a focus for research and documentation of its collection.
- Where possible, the Observatory will document the memories of the people associated with the object, photograph or document.
- The suitability of the storage environment for objects will be assessed periodically.
- No conservation work will be undertaken without the advice of a trained conservator. A Statement of Significance will be made, and an outline of proposed treatment documented before any conservation work is undertaken.
- All restoration and conservation work will be photographed and recorded on the object file.
- The condition of the collection and displays will be checked periodically.
- A stock take of objects will be undertaken at five-year intervals.
- The Observatory will work in partnership with other bodies with an interest in the heritage of astronomy to improve the management, research and interpretation of objects.
- The Observatory will adhere to the Copyright Act 1968, and the Australian Copyright Council Guidelines.
- The Observatory will provide a clean and secure work space for collection documentation, research and significance assessment.

- Reasonable training opportunities will be provided for staff and volunteers working on the collection.

Exhibition and education policies

The main purpose of cataloguing the heritage collection is to make it available for research and use it to educate and inform the public. The policies on exhibition and education are:

- The Observatory collection will be made available for individual research
- The Observatory collection will be made available to the public through well-researched and interpreted displays (real or virtual) and exhibitions.
- Where possible original historic photographs will be copied, with the copies placed on exhibition and the originals kept in secure storage.
- Education programs will be developed to enable students and the public to learn from the collection.

Loans policies

Items may be accepted on loan or items in the heritage collection may be loaned out when to do so will advance the understanding of the history of astronomy in Western Australia. The policy on loans is:

- Loans in or out may be arranged for fixed periods and for specific purposes.
- Before accepting or making a loan the object will be photographed and a detailed record of the objects condition made.
- A written and signed loan agreement will be made between the Observatory and the borrower.

De-accessioning policies

Objects that do not adequately meet the mission, collection policy or collection themes of the Observatory collection will be de-accessioned.

The criteria for de-accessioning an object include that it:

- has little or no significance
- is in poor condition
- is duplicated in the collection and is not a significant and valuable item
- cannot be safely stored or managed
- lacks relevance to collection themes and policy
- lacks relevance to the Observatory mission and purpose.

Items that are proposed for de-accessioning need to be approved by the officer in charge of the Heritage Program.

Items that are owned by the Department will be disposed of according to Government disposal policy.

Authorised

Chairperson
Perth Observatory Volunteer group

Appendix II:

Draft Disaster Management Plan for the Perth Observatory

1. Introduction and Background to Disaster Management

1.1 Definition of Disaster

Definition: Disaster – (noun) **1** a sudden accident or natural catastrophe that causes great damage or loss of life. **2** an event or fact leading to ruin or failure. *Origin* – Italian *disastro* ‘ill – starred event’, from Latin *astrum* ‘star’. *Compact Oxford English Dictionary*

1.2 Introduction

In considering the attached definition it is worth noting that there are two parts to it:

The first part is difficult to prepare for, as it is usually a great event such as an earthquake or a plane crash that no one can predict. In these instances, the emergency services will be in control until the emergency is ended. Only once it has ended can the recovery process begin.

With the second part of the definition we can be proactive by being prepared so that an emergency does not necessarily become a disaster. By identifying risks, and dealing with them, every member of staff can contribute to the prevention of a disaster happening. Whilst every collections’ disaster preparedness plan must allow for a natural catastrophe or some other significant event, it is a stark reality that most disasters are manmade resulting from burst water pipes, leaky roofs, sprinkler discharges, chemical spills, power outages, electrical fires or arson. It is also fair to say that the greatest amount of damage to collections results from water damage or high humidity. For this reason, disaster plans include more technical advice on treating wet artefacts than from other types of damage. This draft plan was prepared by Heritage Conservation Solutions for the Friends of the Perth Observatory to assist them with their overall collection management plan.

As part of Risk Management, it is essential that all staff familiarise themselves with this document and participate in its review process.

The health and safety of people takes precedence over any collection.

1.3 Plan Overview

This plan is set out in three main sections with appendices and maps. It should be used only in conjunction with the **Emergency Procedures Manual**. As part of the overall preparation of an effective plan the team at the Perth Observatory should make sure the office of Francesca Flynn is notified as a matter of priority should any emergency arise.

The main sections are:

1. Prevention

This section covers risk assessment, contact lists, disaster response team names, training, site plan, a list of first aiders and essential personnel. All staff should be very pro-active in doing all they can to minimise risks that might endanger staff or collections. The primary consideration remains the preservation of staff safety.

2. Response

This section should only be used in conjunction with the **Emergency Procedures Manual**, however, instructions are included for various scenarios with a safety checklist. Depending on the severity of the disaster, Emergency Services will be in control and all staff will be take direction from them.

3. Recovery

Once the emergency is over the Recovery phase begins. Owing to the lack of materials conservation teams on the site an emergency recovery plan should include contact with the consultants who prepared the Significance and the Conservation plan for the collection. This section includes recommendations for the salvage and treatment of collection material.

It is useful to have disaster **recovery bins** on each floor of the complex so that relevant resource materials are readily available to paid staff and volunteers and for Emergency Services Personnel (FESA).

2.0 Disaster Prevention

2.1 Risk Assessment

Personal Safety always takes precedence over the safety of collections. The following procedures must be followed for situations of physical threat or possible emergency situations. As all staff walk around the buildings, checks should be carried out for the following:

Evidence of water; for example, surface water, leaks from roof and fixtures

- Dripping from pipes, building expansion joints, drainage trays;
- Sound of water dripping;
- Water stains on floor, walls, ceilings, light fittings, etc;
- High humidity; damp musty smell;
- Mould;
- Used Emergency supply cabinets;

Fire hazards;

- Build-up of possible fuel and sources of ignition, e.g. chemicals, cleaning agents, cardboard boxes exposed to heat or flame
- Blocked access to firefighting equipment and exits;

Smell of chemicals, gas or smoke;

Evidence of pests – any pests found may be an indication of more in hiding, look for damage, nests, droppings/grass, or remains, smell, damage to collections;

- Regularly checking insect remains in blunder traps or evidence of insects having been near the test sites;
-

Physical Damage to doors that don't close properly;

- Broken or open windows;

Strangers in collection areas.

Use the attached risk assessment template. Follow up with direct contact to ensure that a response is occurring. If for any reason a response is not happening quickly enough, deal with the situation yourself after letting the acting Chief Warden know. A disaster is an emergency that is out of control; by containing the emergency we prevent the disaster.

Risk Assessment – see Appendix 6

Disaster Preparation

- **Emergency Contact List**
- **Disaster Response Team**
- **Collection Priority List**
- **Training**
- **List of First Aiders**

2.2 Emergency Contact List

See Appendix 8

2.3 Disaster Response Team

See Appendix 9

2.4 Collection Priority List: Venue and Location

See Appendix 10

2.5 Training

- All staff are required to undertake Fire Safety Drill at least once a year.
- Relevant staff will be trained in the detection of volatile fumes
- All staff must familiarise themselves with their site plan and Muster points
- Staff must know where spill kits and disaster bins are located (refer to site plan)
- Staff must be aware of the requirements for treating damaged objects as outlined in **Salvage Procedures** but only carry out these treatments if they are trained so to do. This needs to form part of all staff induction training and needs to occur within the first two weeks of employment.

2.6 Site Plan for Perth Observatory, Bickley

2.7 Essential Personnel

Essential personnel for serious physical threats to collections & buildings

Disaster Coordinator

- Sets up and co-ordinates all activities of the Disaster Support and Salvage Teams: Building and Objects and Systems.
- Appoints Support and Salvage team leaders from the Disaster recovery Team drawn from the appropriate areas.
- Sets up Control Post and assigns designate to assist.
- Ensure that procedures are in place freeze all wet material before mould breaks within hours after wetting.
- Frozen materials can be effectively freeze dried by contract conservators operating out of the Shipwrecks Museum in Fremantle.

Security Personnel (wardens, curators, Heads of Department etc.)

- Responsibility of 'first response' to any emergency.
- Ensuring that buildings and adjacent areas are evacuated quickly and safely.
- Wardens to contact and liaise with Emergency Services as necessary.
- Contact the Disaster Coordinator to initiate Disaster Recovery procedures.
- Maintaining security for people, collections, and for plant, (in that order) before, during and after disaster recovery.
- Shutting services down as necessary.
- Maintaining services as necessary during and after an emergency.
- Liaising with Emergency Services personnel on site.
- Initiating and overseeing disaster recovery for the buildings, site, plant and systems.

Astronomers

- Provides expert advisory role identifying the relative (historic and monetary) values of objects or collections to be saved.
- Assist with triage response.
- Assist with movement and relocation to recovery area.
- Provide insurance assessments and work with insurance company regarding claims.

Records Manager

- Supervises recovery of records including Finance, Personnel, Venues and Visitor Programs records etc.

Registration

- Expert advisory role identifying the locations of exhibition and storage objects
- Oversees/coordinates the handling, packing, movement, tracking and transport of objects during disaster recovery and provides materials, supplies and transportation for this purpose

-

Personnel

- Oversee the recovery of confidential records pertaining to the employment of all Observatory personnel.

-

Finance

- Oversee the recovery of financial records pertaining to the Observatory activities, under the supervision of the Records Manager.

Visitor Programs

- Co-operate with Security to ensure that all public site visitors are safely evacuated from the premises.
- Overseeing the recovery of visitor program records, under the supervision of the Records Manager.

Photographer

- Photographs damage before, during and after salvage operation.
- Advises on photographic priorities
- Overseeing the recovery of the Observatory's photographic records, under the supervision of the Registrar.

Library

Oversees the recovery of all Library materials, archives and current records of the location of all the library books and archives.

2.8 First Aid Officers

See Appendix 10

3.0 Disaster Response

1. Use the Emergency Procedure Manual for the threat of disaster
2. Evacuate visitors and staff if necessary, retrieve Priority List Objects if possible, without endangering safety of people.
3. Call Emergency Services, Fire Brigade, Police or Ambulance, if relevant, and Disaster Coordinator.
4. Work through Safety Checklist to determine site stability.
5. Ensure there is no source of ongoing damage, (turn off water, cover shelves etc.).
6. Stabilise the situation as much as possible, (turn off utilities, open windows if appropriate to vent smoke, but only under appropriate direction of emergency personnel).
7. Use the contents of the Spill Kits or Disaster Bins to deal with any immediate problems.
8. The most senior officer on site assess the damage and the situation to determine the extent of the disaster.
9. Check that the Disaster Coordinator has activated the telephone "tree" to call the rest of the Disaster team if required.
10. Once the situation has stabilised use the Disaster Recovery Plan to start the recovery phase.

3.1 Safety Checklist

SAFETY OF PEOPLE SHOULD BE YOUR PRIMARY FOCUS

To determine whether there are any risks to your safety run through the following checklist, if the answer to any of these questions is YES, the site is unsafe. Leave the area and DO NOT re-enter until Emergency Services personnel have deemed it safe.

- **Are there electrical wires or power points in contact with water?**
- **Does the water extend beyond your view? (Electrical contact may be occurring where you can't see it)**
- **Is there more than five centimetres of water on the floor?**
- **Are the passageways blocked or obstructed in anyway?**
- **Is there danger from falling material?**
- **Do the walls/ceiling appear unstable?**

3.2 Disaster Response Team

See Appendix 12

3.3 Disaster Response Telephone "Tree"

(please insert an appropriate plan that shows all responsible persons)

3.4 General Evacuation Instructions

If you are directed to evacuate the building (either by an alarm or by staff or emergency services):

- Remain calm.
- Turn off all hazardous operations.
- Follow instructions.
- Assist infirm or injured people.
- Leave the area in an orderly fashion.
- Follow the established evacuation route.
- Move away from the building. Go directly to the assembly area and report to the Evacuation Coordinator for a 'head count'.
- Stay in the assembly area until instructed otherwise.
- Do not block the street, driveway or building entrances.

Fire

In case of fire:

- Remain calm.
- Activate the fire alarm.
- Determine location and source, if this can be done quickly and safely.
- Contact the Fire Brigade (000). Give the name and location of the Perth Observatory to the Fire Brigade.
- Contact the Disaster Response Coordinator
- Always put the safety of people (including yourself) first.

- If the fire is small, try to extinguish it with the relevant type of extinguisher or fire blanket.
- Do not allow the fire to come between you and the exit.
- If it is safe to do so, turn off electrical equipment, especially if it is smoking.
- Evacuate the building.
- Go directly to the assembly area.
- Do not open a hot door (before opening a door, touch it near the top. If it is hot or if smoke is visible, do not open).
- Do not attempt to save possessions.
- Do not return to the affected area until told to do so by the appropriate authorities.

Power Failure

If there is a power failure either in the building or the local area:

- Remain calm
- Remain where you are and open all available blinds/shades/curtains to obtain more outside light.
- If you are in an unlit area, carefully proceed to an area with emergency lighting.
- If telephones are working, the warden will call the power company
- Wait for further instructions from authorities.
- If directed to evacuate, go to the assembly area.
- If you are in an elevator, stay calm. Use the intercom or emergency button to alert others.

Severe Storm

Usually if there is a severe storm there should be advanced warning:

- Contact Disaster Response Coordinator
- Listen to your local radio station for weather updates.
- Disconnect electrical equipment and appliances not in use.
- Secure outdoor items, where possible move them inside.
- If safe to do so check gutters and down pipes.
- Have battery-powered equipment such as torches at hand.
- Only use the telephone for emergency calls.
- Tape across windows or attach plywood sheets.
- Put plastic sheeting over shelves, large items, display cases.
- Backup software and data files.
- Evacuate when instructed to do so.

Cyclone

- Board up windows or protect them with storm shutters or tape. Try to seal around the windows. Some should be left slightly open to equalise the pressure.
- Limit access to the building to one door and secure the others
- Try to seal any areas that would allow water access.
- Move collections away from the windows.
- Leave low-lying areas that may be swept by high tides or storm waves.
- Stay in the building if it is sturdy and on high ground. If not, move to a designated shelter.
- Evacuate to a local shelter if ordered to do so by authorities.

- Remain indoors. Don't be fooled by the calmness of the 'eye' of the storm. Remember, the winds on the other side of the 'eye' will come from the opposite direction.

Flood (1)

(Small scale-leaks, broken pipes, accidental sprinkler discharge, groundwater, rainwater)

- Attempt to determine the source of the water, if this can be done quickly and safely.
- If source is determined, cut off water if feasible.
- Switch off all utilities in the affected area, including the water main, if it is safe to do so.
- Check for live wires or wet power outlets, DO NOT enter the area if these are found.
- Notify the Water Authority if the water mains or sewer is involved.
- Contact Water Authority (**Phone:**), Disaster Response Coordinator (**Phone:**), Plumber (**Phone:**), Building maintenance services (**Phone:**).
- Determine if something can be done immediately to stop the leak or contain it.
- Place weighted screens over floor drains to prevent loss of small objects and detached fragments.
- Move affected objects to a safe area, if necessary.

Flood (2)

The likelihood of a flood on the Bickley site is very low and is effectively managed by the terrain

Bushfire

- Where possible move outdoor collection items inside or out of the fire's path.
- If there is a bushfire warning, listen to the local radio station for updates.
- Prepare to evacuate upon direction.
- Follow the instructions of the local emergency authorities (SES, police, CFA etc.).
- Check battery powered equipment and backup power sources.
- If a bushfire is approaching stay inside keeping windows and doors shut, block gaps from inside with wet towels.
- Fill buckets and sinks with water and prepare equipment for fighting small internal fires.
- Hose down external walls, roof and garden on the side facing the fire, if it is safe to do so.
- Remove combustible materials from around the building.
- Attach a hose to outside mains tap.
- Allow the bushfire to pass before exiting the building.

Bomb Threat

If you receive a bomb threat through a telephone call:

- Remain calm.
- Listen carefully, be polite and show interest so that you can collect as much information as possible.
- Try to keep the caller talking to learn more information.
- If possible, write a note to a colleague to call the police or, as soon as the caller hangs up, notify them yourself.

- Complete the attached Bomb Threat Checklist immediately. Write down as much detail as you can remember.
- Follow the instructions of the police or Observatory security.
- Evacuate as directed.

Bomb Threat Information Sheet

- Do not hang up the telephone
- Ask the following questions:
 - When is the bomb going to explode?
 - Where is the bomb located?
 - What does the bomb look like?
 - What kind of bomb is it?
 - What will cause the bomb to explode?
 - Did you place the bomb?
 - What is your name?
- Record or note the exact wording of the threat.
- Sex of the caller (if possible).
- Estimate the age of the caller.
- Length of call.
- Note the sound of caller's voice.
- Is the voice familiar?
- Background sounds e.g. trains, machinery, and animals.

Explosion

In case of an explosion in your areas:

- Remain calm
- Take cover under a table or desk.
- Be prepared for possible further explosions.
- Notify emergency services (000:)
- Stay away from windows, mirrors, overhead fixtures, filing cabinets, bookcases etc.
- Follow the instructions of security, emergency personnel or the police.
- Evacuate calmly, as directed.
- Do not move seriously injured personnel, unless they are in immediate danger (fire, building collapse etc.)
- Open doors carefully, watching for falling objects.
- Do not use elevators.
- Avoid using the telephone, except in a life-threatening situation.
- Do not use matches or lighters.
- Do not re-enter the affected area until directed by emergency preparedness team.

Earthquake

In an earthquake the ground movement seldom causes death or injury. Most casualties occur because of injury from falling objects or flying building materials. These items include broken glass and dislodged bricks. Fire can occur due to fractured gas lines or chemical spills. Burst pipes can cause water damage.

If an earthquake is occurring:

- Human safety is the priority.
- Take cover in a supported doorway or under sturdy furniture.
- Stay away from glass windows, doors, display cabinet, bookcases.
- Do not use an open flame such as matches or candle as there may be gas leaks.

After the Earthquake:

- Contact Emergency Services (000)
- Be prepared for aftershocks.
- Extinguish all fires with the proper type of fire extinguisher.
- Check for broken water pipes, shorting electrical circuits or leaking fuel.
- Turn off all gas and water at main valves or meter boxes if you smell gas or see water flowing.
- Turn off all electrical appliances at the power point.
- Open doors carefully and watch for falling objects.
- Do not use elevators.
- Carefully move outside and away from the building.
- Do not re-enter the building until instructed by emergency personnel.

4. Disaster Recovery

4.1 Steps in effective disaster recovery

(Once immediate response is complete, and the building is declared safe)

The local head of the Disaster Recovery team will:

1. Assemble Disaster Response Team and prepare to sketch out the Recovery Plan.
2. Review the situation and make sure you have all relevant information:
 - extent and type of damage
 - priority list objects that were damaged
 - condition of the environment of the building
 - general feeling about size of recovery operation (will outside help be required?)
3. Ensure all damage is documented and photographed.
4. Determine what you need for recovery – volunteers, material and equipment, outside expertise, space, freezer facilities.
5. Organise the team – some to focus on environment, others on salvage.
6. Modify (stabilise) the environment (remove wet material, open windows, fans)
7. Specify which salvage procedures will be used and decide on the Team leaders for each procedure.
8. Use the salvage procedures to set up the areas for salvage.
9. Move into salvage operations-making sure all object movement and treatment are documented.
10. Ensure adequate supplies are on hand and that you have all the help you need.
11. Ensure all formal notifications have occurred – council, insurance company etc.
12. Ensure all workers are well looked after. Celebrate milestones and keep everyone informed.

4.2 Salvage Procedures

As you have worked through the risk assessment section of the plan, you will have identified a few different disaster scenarios that may threaten your facility – such as bushfire, flood, leak, vandal attack, pest outbreak, earthquake, and power failure. While the types of disaster can vary, water damage is the most common result. Certainly, there will be smoke and fire damage after a fire, but the water used to put the fire out will be your most immediate issue. Similarly, if your building has its roof torn off during a cyclone, it is the storm water, which follows that, will cause most of the damage to the collection. Therefore, most of the information presented here will cover salvage procedures for water-damaged material. Other types of damage will be covered in less detail.

Salvage Procedures for Various Material Types

The following are some general approaches to the salvage of various common collection materials. This list cannot cover every collection type and you will need to tailor it to the specific needs of your collection. If you have any doubt do nothing and contact a conservator.

Furniture

- Inspect painted surfaces. If paint is blistered or flaking, air-dry slowly without removing dirt or moisture.
- If there is no paint or the paint is intact, rinse/sponge surfaces gently to clean. Blot, air dry very slowly to prevent warping, shrinkage and delamination. Covering the furniture will slow down the drying rate but be sure to monitor for mould growth.
- Hold veneer in place while drying with weights or clamps, always use protection/padding between the weight/clamp and the veneer.

- Finishes may develop a white haze (bloom). This does not require immediate attention.

Upholstered Furniture

- Rinse off mud, do not rub.
- Remove cushions, lift-out seats, and other separate pieces. Make sure you document which piece they belong to.
- Wrap upholstered materials in cloth (sheet, towels etc.) to air dry and replace cloth when damp.
- Blot wood sections and allow to air dry slowly.

Metal

- Use gloves to handle.
- Rinse/sponge and blot metal object. Air dry.
- If the object has applied finish, do not clean. Air dry; keep flaking surfaces horizontal.

Leather

- Leather can be fragile when wet. Support on a board or in a tray always.
- Rinse/sponge with clear water to remove mud.
- Drain and blot to remove excess water.
- Reshape as necessary and pad with towelling or nylon netting to support the form during drying.
- Air dry.

Paintings on canvas

- If possible, remove painting from its frame in a safe, dry place.
- DO NOT separate paintings from their stretchers/strainers.
- Keep wet paintings horizontal and paint-side up with nothing touching the surface.
- Check for any surface damage.
- If the surface is damaged – that is if there is any lifting, buckling or blistering of the paint, air dry the artwork face-up and don't place anything on top of it.
- If the paint looks stable and is not wet, place the work face down on a layer of blotter covered with unwrinkled tissue paper. Unprinted newsprint (butcher's paper) will suffice if you can't find anything better (if this sticks to the face of the work, consult a conservator, do not attempt to remove it).
- Cut a thick piece of blotting paper to fit over the back of the painting inside the stretcher; cover this with a piece of Perspex cut to the same size or something to weigh down the blotting paper.
- Put a thick filler material such as 7mm – thick felt or board cut to the same size, on top of the Perspex.
- Place another piece of thick blotting paper over the stretcher so that it extends beyond the edges of the work.
- Place another piece of Perspex, larger than the stretcher on top, then weigh down the stack evenly (do not use too much weight, weights of 500g are enough).

Art on Paper or Photos with Glass fronts

- Remove from frames in a safe dry place unless art is stuck to the glass.
- If image sticks to the glass, leave it in the frame, dry glass side down.
- If image can be removed, dry artwork slowly image side up on a sheet of blotting paper.

- If the medium appears soluble, support the item between polyester gauze and a board, and freeze.

Photographs

- Remove from plastic/paper enclosures or frames. Save all information about the photos.
- Carefully rinse with clear water.
- Do not touch or blot surfaces.
- Air dry by hanging from a line with plastic pegs or clips.
- Alternatively, lay flat, image side up on absorbent paper.
- Keep photographs from contact with adjacent surfaces or each other.
- If there are too many to dry at once, keep photographs (except historic ones) in a container of clean water for no more than 48 hours, then air dry.
- Freeze, interlaying with freezer paper if possible.
- DO NOT freeze glass plate negatives.

Books

- If rinsing is necessary do so with clean water, holding book closed.
- Partially wet or damp books can be air dried by standing on the top or bottom edge with the covers opened to 90°.
- Very wet books can be air dried by lying flat on a clean surface, interleave less than 20% of the book with absorbent material, replace interleaving when damp.
- Books with glossy paper need to be frozen, if possible.
- Wrap every second book in freezer or waxed paper.
- Place spine down in sturdy containers. Freeze.
- If there are too many books to deal with in 48 hours, further books can be frozen in the manner outlined above.

Paper

- Air dry flat as individual sheets or small piles (up to 5mm). Interleave, replace interleaving when damp.
- Do not unfold or separate individual wet sheets.
- If there are too many items for air-drying, interleave (by groups or individuals) with freezer or wax paper.
- Pack papers or files supported and standing up in sturdy containers, only pack 90% full. Freeze.
- Ensure all items on glossy paper are fully separated or freeze them.

Audio and Video tape

- Wear gloves when handling to avoid scratching the surface.
- Do not use magnetised tool/scissors.
- When copying, clean drive heads frequently to protect equipment.
- The casing may keep tapes clean and dry. However, if the tape itself is damaged:
 - Disassemble the case and remove the tape.
 - Rinse dirty tapes, still wound on reel, in lukewarm water
 - Support vertically on blotting material to air-dry.
 - Reassemble and copy.

Diskettes

- Wear gloves when handling to avoid scratching the surface.

- Do not use magnetised tools/scissors.
- When copying, clean drive heads frequently to protect equipment.
- Remove diskette from casing and bathe in clean distilled water.
- Dry with lint-free towels.
- Insert diskette into new casing and copy.
- Do not attempt to play the damaged disks as they can damage the equipment on which they are played.
- DO NOT freeze.

Glass plate negatives

- DO NOT freeze
- Air-dry immediately lying flat with the emulsion side (the duller side) facing up, on a clean absorbent paper, or stand them upright in a dish rack to dry.

Maps, plans and posters

- If these items are hand-coloured or if inks appear to be bleeding, interleave the items with freezer paper and freeze them immediately.
- If the paper appears glossy, place sheets of polyester gauze on either side to prevent the paper sticking to the blotter which is placed on top. Or you could allow the paper to dry without anything on top.
- Alternatively, air dry as follows:
 - Interleave individual items with sheets of blotting paper. These need to be larger than the items.
 - Place a board on top of a pile of up to 10 maps or plans and weight it evenly.
 - Change the blotting paper regularly, at least daily, if not more often, as it becomes wet.

4.3 Collection Priority List: Venue & Location

Collection/Object	Location	Number
Transit circle telescope 1896	Front foyer	
Grubb Astrographic 1896 13" scope	Dome park	
Lowell 24" telescope c. 1970	Dome park	
Perth Lowell Automated telescope	Dome park	
Celestron 14" c. 1980 scope	Dome park	
Calver 12.5" 1910 telescope	Dome park	

4.4 Object Documentation

Date	Object	Number	Damage	Name of Assessor	Treatment	Location

DRP Appendix 2. Perth Metropolitan – Private Sector – General Services

Service	Company	Telephone
Computer Control – Fire Alarms	Wormald Fire Systems	9479 2999 (24 hours)
Locksmiths		
Glaziers	Mobile Glass	9300 2770; 041 895 0152 (24 hours)
	O'Brien Glass	132 452 (24 hours)
Roller Door Service		
Cleaning Services	Delron Cleaning	9328 3888; 041 996 4319 (24 hours)
Transport Providers	Allied Pickfords – Dale Driesens	041 890 4521
Building Hire Equipment including lights	Belmont Hire – 149 Fansisco Street, Belmont.	9478 1466, 9277 4364, 9277 7322
	Coates Hire – Ascot	9277 7322
	Broomhall's Ezy-Hire – 6 Loftus Street, Leederville	9322 6593
Lifting Equipment	Crown Forklift (Gallery Supplier)	9353 6333
	Clarklift (forklifts)	
	Brambles Forklifts –Brambles	9493 3433
	Specialist Crane Hire	9455 2911 9427 1600
Marquee Hire	Pedersens	9456 3000
Pest Control	Aaron Lee Pest Control	
Chemical Analysis	Government Chemistry Lab	9325 5544
Climate Control Equipment	Munters	03 9562 3677
Crates/Painting Packs	Art on the Move	9227 7505
	Grace Removals	9353 0222
	DAS	9347 4016; 041 790 8788 (24 hours)
Plastic trays, Crates Possible Loan or Hire	Blythe Enterprises (Nylex products)	9445 1622
	Menzels 9455 2670 (Nylex products)	
	Bakers Delight Brumbys	9381 8666
	Tip Top	9474 4900
		9311 5100 9328 9611
Emergency Power Generation	State Emergency Service – see part 1 above Hire companies as above	
Deep Freeze Services	P & O – Gary Walters 1 Quarrymore Rd, Spearwood	9418 3300 041 115 0291
Photo Processing Salvage Facility	LISWA Kodak Churchill Agfa (Head Office)	9427 3313 1300 367 454 9381 9688 03 9264 7711

Note – Please refer to Procurement Guidelines to ensure services are engaged in accordance with State Government purchasing.

Appendix 3. Specialist Materials and Suppliers List

Supplier	Product
ARCHIV SAFETY 6/511 Abernethy Road, Kewdale Ph: (08) 9353 1613 Fax (08) 9353 1883	TYVEK (By the metre)
ART PAPERS & SUPPLIES 243 Stirling Highway, Claremont Ph: (08) 9384 6035 Fax: (08) 9384 8016	Japanese papers, tissue, archival adhesive tapes.
ANTWERP UPHOLSTERY 10/120 Briggs Road, Welshpool 9361 6769	Dacron
ATKINS CARLYLE 1/30 King Edwards Road, Osborne Park Ph: (08) 9446 9666 Fax: (08) 9446 8745	Safety wear, dust/mist respirators, disposable nuisance odour masks
BUNZYL 5 Sherman Street, Canning Vale 6155 Ph: (08) 9328 4200 Fax: (08) 9227 7461 (for bulk purchase 9360 3622)	Polypropylene bags, consumables such as paper towels, latex gloves, plastic sheeting, packing tape, bubblewrap.
CHARLES PARSON 14 Ledger Road, Balcatta Ph: (08) 9240 2488 Fax: (08) 9240 2544	Parasilk, calico
DALTON DINE PAPER 2 Fairford Road, Bassendean Ph: (08) 9279 1999	Drink coaster blotter, butchers' paper.
H L JESSOP PTY LTD 16 Murchison Terrace Ph: (08) 9328 3355 Fax: (08) 9328 6683	White cotton gloves
LARSON JUHL 19 Bishop St, Jolimont Ph: (08) 9383 9111	Foamcore, framing supplies
KENDALS 372 Newcastle Street Ph: (08) 9328 4833	Brushes, canvas, Velcro

MULFORD PLASTICS 21 Pearson Way, Osborne Park Ph: (08) 9446 9933 Mob: 041 234 0041	PERSPEX, corflute – cut to size.
PAPER MERCHANT 316 Rokeby Road, Subiaco Ph: (08) 9381 6489	Artist brushes, tissue, papers, tapes.
PAPER HOUSE 339 Collier Road, Bassendean Ph: (08) 9240 1444 Fax: (08) 9240 1420	Paper, blotter.
PARKINSON AND MANN 51 King Edwards Road, Osborne Park Ph: (08) 9244 4433	Cotton tape and webbing.
SPOTLIGHT Forrest Chase	Thread, calico, Parasilk equivalent.
SURGICAL HOUSE 166 Railway Parade, West Leederville Ph: (08) 9381 4199 Fax: (08) 9382 3009	Cotton swabs, surgical masks.
TEMPO ART PRODUCTS Unit 2/1 Natalie Way, Balcatta Ph: (08) 9344 7222	Mountboard, foamcore.
ZETTA FLORENCE PO Box 109, Fitzroy 3065 Ph: (03) 9416 3623 Fax: (03) 9416 2360	Archival & Conservation Supplies

Note – Please refer to Procurement Guidelines to ensure services are engaged in accordance with State Government purchasing.

DRP Appendix 4. Disaster Recovery Supply Bin Contents

Material	Use	Quantity
Plastic rubbish bin	Catching water	1
Buckets	Catching water, cleaning up	2
Black garbage bags	Carrying material, cleaning up	20
Rubber gloves	Health and safety	3 pairs
Tyvek coats	Health and safety, protective clothing	4
Clipboard, notepad and pencil	Recording movement of collection, etc.	1
Marker pen	Marking transport boxes	1
Clear plastic sheeting (2m x 6m)	Covering shelves, etc.	3
Packing tape	Adhering plastic sheeting	2 rolls
Emergency tape	Marking/isolating work & emergency areas	2 rolls
Scissors	Cutting plastic, tape, etc.	2 pairs
Utility Knife and blades	Cutting plastic, tape, etc.	1
Sponges	Cleaning up	3
Chux wipes	Cleaning up	5
Squeeze mop	Cleaning up	1
Soot sponge	Cleaning up soot and dust	1
Disposable gloves	Health and safety	1 pack
Small freezer bags	Housing objects for freezing	80
Large freezer bags	Housing objects for freezing	80

Dust masks	Health and safety	5
Blotting paper	Drying objects, interleaving	Sheets
Butcher's paper	Multi-purpose	Sheets or rolls
Clothes line	Hanging items to dry	2
Gauze bandage	Protecting fragile/damaged items	5 rolls
Safety goggles	Health and safety	2 pairs
Dymotape and gun	Labelling	1
Disposable camera	Recording	1
First Aid Kit	Health and safety	1
Disaster Prevention and Recovery Plan	Contact numbers, salvage instructions, etc.	1

DRP Appendix 5. Safety Inspection Checklist

Date _____ Workplace _____

Structure Work premises, Equipment, Chemicals	Guidelines	Yes	No	N/A	Comments (On "No" answers)
Floor surface is safe for people to walk on.	Even surfaces. No holes. Free from slip or trip hazards or has a caution sign warning of danger.				
Floors in wet areas are non-slip.	Self-explanatory.				
There is adequate space for staff to work safely.	This includes enough room to attend to the needs of customers and to move objects safely.				
Visual inspection reveals that the building is trim (in good order) and in safe condition.	Includes doors, windows, walls, ceiling, steps, fire escape, guttering etc.				
Signs for fire alarms are easily identified.	Self-explanatory				
Signs for fire extinguishers are easily identified.	Self-explanatory				
Fire hose is easily identified.	Self-explanatory				
Exit doors are easily identified.	Self-explanatory				
Exit doors are easily accessible.	Not obscured by furniture, etc.				
All fire doors are operable.	Open easily. Close appropriately.				
Emergency numbers are displayed on all phones.	Self-explanatory				
Adequate and private toilet facilities are available.	Toilet paper is provided. Toilets are cleaned regularly. Toilet doors are accessible from outside in an emergency.				
Washing facilities are adequate.	Facilities are easy to use for hand washing. Soap is provided. A clean towel or other hand drying facilities are cleaned regularly.				
Visual inspection reveals that electric cords and electrical equipment are in a good state of repair.	No broken plugs, sockets or switches. Electric cords are not frayed or have wires exposed. All electrical equipment functions correctly. Maintenance records are available.				

Work chairs are well designed and height adjustable.	Employees are comfortable when sitting on chairs.				
Visual inspection reveals all equipment is safe and in good repair.	For example. Wheels on all equipment are freely moveable.				
Policy and Procedure Manuals are easily available for staff use.	Policy and Procedure manuals are kept on an office shelf to which staff have easy access.				

Work processes	Guidelines	Yes	No	N/A	Comments
Policy & Procedure Manuals are easily available for staff use.	Policy & Procedure manuals are kept on an office shelf to which staff have easy access.				
Level of cleanliness & general housekeeping is good.	Includes excessive rubbish not accumulating on the premises but being disposed of safely. No visible build-up of dust on the premises. Equipment not in use is stored safely. No equipment blocking access ways.				
"Wet floor – Caution" signs are used during floor cleaning.	Self-explanatory.				

WORKPLACE MANAGER'S NAME: _____

Signature: _____ Date: _____

SAFETY & HEALTH REPRESENTATIVE: _____

Signature: _____ Date: _____

NAMES OF OTHER REPRESENTATIVES:

FOLLOW UP ACTION ON PROBLEMS IDENTIFIED

INFORMATION ON CORRECTIVE ACTION TO INCLUDE:

1. The name and designation of the person who is to perform the follow up action.
2. A time frame for implementing the follow up action.
3. A description of the follow up action.
4. Outcome of follow up action.

DRP Appendix 6. Risk Assessment

Potential risks for: (Insert venue and location e.g. – Kew St, History, storage area 10)

Risk	Impact High-Low (5-1)	Probability High-Low (5-1)	Preventive Actions	Person Responsible	Date Reported	Date Actioned

DRP Appendix 7. Emergency Contact List

(insert names pertinent to location)

State Emergency Services	Name	Contact Number
Fire Brigade		
Police		
Ambulance		
Gas Supply		
Synergy		
Disaster Coordinators		
Disaster Response Team		
Security/Site Manager		

DRP Appendix 8. Disaster Response Team

(insert names pertinent to location)

	Name	Contact Number
Disaster Coordinator		
Site Manager		
Facilities Manager		
Staff		
Conservation Staff		
Media Coordinator		
OS&H Person		
Finance Officer		

DRP Appendix 9. Collection Priority List: Venue and Location

Collection/Object	Location	Number	Removed To	Persons Name	Date

DRP Appendix 10. First Aid Officers
(insert venue location)

Certificate	Name	Contact Number

DRP Appendix 11. Disaster Response Team
(insert names pertinent to location)

	Position	Contact Number
Disaster Coordinator		
Site Manager		
Facilities Manager (if site position exists)		
Staff		
OH&S Officer		
Finance Officer		

DRP Appendix 12. General procedures for air and freeze drying of water damaged objects and materials

General Outlines

Air Drying

For much water-damaged material, air-drying is the common method for salvage. While it is often easier to air dry the material away from the collection storage area, you will probably need to dry some material in the main building. There are a few ideas to keep in mind if you need to dry the building before drying the collection. There is little point in trying to dry wet material in a damp building.

- Remove any wet material such as paper towel, stationery, pamphlets, boxes and curtains.
- Open windows and bring in fans. This will help air to circulate, reducing the risk of a mould outbreak and move drier air into the building.
- Look for hidden areas where water can pool such as behind items on a shelf, at the back of a storeroom or under furniture.
- Remove wet carpet if necessary. Check the underfelt of the carpet. This often acts as an enormous blotter. It may be more effective to remove and replace the underfelt than to dry it.
- Portable dehumidifiers will greatly assist in dropping the relative humidity. Most have a water-collecting chamber, which needs to be emptied regularly, and you may need several for the large Observatory building. (This is a need that should be identified before a disaster).

Freezing

Freezing is used to minimise damage to vulnerable, water-damaged materials and to buy time when dealing with a large collection. Freezing is necessary to prevent 'blocking' if you have wet glossy papers, and mould growth on water-damaged books, documents etc. If you have a large collection that you cannot dry in time to prevent mould growth. It is also useful for material with water-soluble components such as watercolours, some dyed textiles and documents with water-soluble inks. Although freezing will halt further mould growth, the spores are not killed by the process. Similarly, 'blocking' will be halted but glossy papers need to be freeze dried rather than air dried after freezing.

Remember that this process can take a long time and once frozen, you will not have access to the material until the treatment is completed. It may be difficult to find freeze-drying services for those objects that will not be air-dried, after the freezing.

It should only be used for large amounts of water-damaged material that you do not think you have time to air-dry before mould starts occurring; and for material that will be permanently damaged if it remains wet for any length of time.

Procedure:

- Books can be packed for freezing in plastic containers, milk crates, bread trays or cardboard boxes. The books should be packed spine down in a single layer. If there is time, wrap every second item in waxed or freezer paper to prevent the covers sticking to each other.
- Textile items can be laid out flat with tissue or freezer paper rolls in the folds. Ensure that freezer paper is used to separate items if you need to have one on top of another. Use long boxes or board to transport items.

A commercial blast freezer is ideal for freezing this material as it drops the temperature quickly and has a large capacity. For a small amount of material, a household chest freezer with a temperature of -20°C can be used. After the freezer has been packed, do not open it until you are ready to remove the material, as this will begin a freeze/thaw cycle. Do not use a defrost freezer as this will automatically go through freeze/thaw cycles which will be damaging to the material.

When transporting material from the freezer to the freeze drier, it must remain frozen. Hence a freezer truck will be needed. If you are unable to accompany the material, the importance of keeping the material frozen must be stressed to the transport company.

DO NOT FREEZE:

- Paintings.
- Items with resinous components.
- Photographs, film, glass plate negatives.
- Items with painted components (e.g. painted wood)
- Items with glass components.
- Electronic Media (e.g. cassettes, videos, records).
- Furniture.
- Stone, glass, ceramics, metals.
- Musical instruments.

Veneered wooden objects, or other constrained objects.