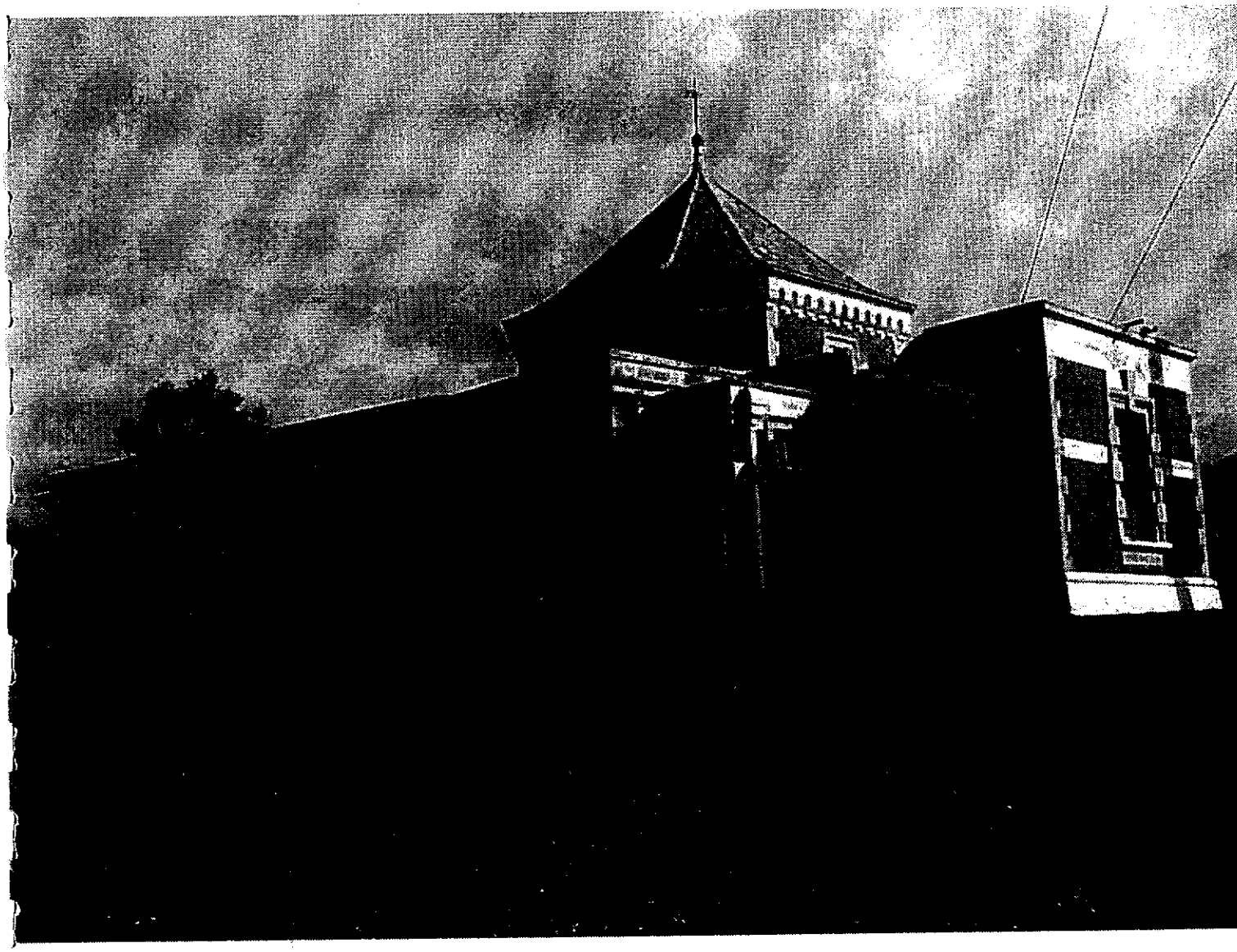
Dominion Observatory and Gardens Battery conservation plan

Including a specification for remedial work and regular maintenance

2003



Department of Conservation
Te Papa Atawhai

Dominion Observatory and Gardens Battery conservation plan

Including a specification for remedial work and regular maintenance

JANUARY 2003

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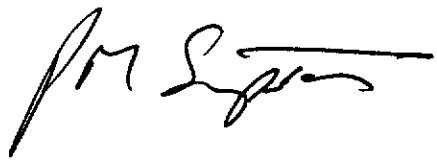
Foreword

The Conservation Plan for the Dominion Observatory and Gardens Battery has been adopted by the Wellington Conservancy, Department of Conservation. It is the intention of the Department to implement the policies contained within the plan, which will provide the means for the continued protection and preservation of this nationally important place.

Approval and acceptance of the Conservation Plan ultimately commits the Department to the expenditure of considerable financial resources at this historic place. The timeframe for implementation will of necessity depend on availability of finance.

The remedial work specified will be prioritised and progressively undertaken. The regular maintenance specified is designed to minimise future deterioration of the place, and the intention is to meet this on-going commitment.



Peter Simpson
Area Manager

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1. Introduction

1.1 PURPOSE

This plan prescribes for remedial and regular maintenance works to assist in the conservation of the Dominion Observatory. The purpose is to care for this historic place so that it's meaning and importance is conserved and interpreted for present and future generations.

1.2 EXECUTIVE SUMMARY

The Dominion Observatory is located on Salamanca Rd, between the New Zealand Meteorological Service Building and the Carter Observatory, at the southern extent of the Wellington City Botanical Gardens. The observatory building built in 1907 housed the New Zealand Time Keeping Service from 1907 till c. 1940 and was also the principle site for seismological recording in New Zealand till 1995. The Observatory has three levels, a basement, the ground floor and a single room at the first floor level. The exterior is predominantly red brick and plaster, and complemented by a slate roof with lead flashings. The building's basement was built in 1894 and were originally the Gardens Battery and magazine, which was part of the coastal defence network for Wellington Harbour. The shell and cartridge stores are still in relatively original condition.

The building is of high scientific and architectural significance and is classified as a *Category I Building* under the Historic Places Act (1993) meaning that it has *'special or outstanding historical or cultural heritage significance or value.'* The building is also listed on the Wellington City Council District Plan's heritage inventory. It is located on a Local purpose Reserve under the Reserves Act (1977).

The building's current physical condition is good, although five years of vacancy is beginning to takes its toll. Much of this can be controlled by the remedial work and general maintenance outlined in sections 8 & 9 of this plan. The most significant threat to the overall health of the building is continual vacancy. Therefore a suitable tenant to lease the building, who will make as little change to the significant fabric as possible, is a priority.

1.3 MANAGEMENT STATUS

The Department of Conservation (DOC), Wellington Conservancy, manages the Dominion Observatory. It is located within the Poneke Area, whose staff are responsible for managing any remedial work and regular maintenance.

It has the following statutory management status:

- *Historic Places Act (1993)* Registered category 1 registration number 4700/1986
- *Conservation Act (1987)* Wellington Conservation Management Strategy
- *Resource Management Act (1991)* Listed on the schedule of heritage buildings in the Wellington District Plan

This historic asset is scheduled in the Wellington Conservancy Register of Actively Managed Historic Places. The status 'Actively managed' means it is eligible for the specific allocation of funding for historic conservation work and the provision of visitor services.

1.4 ASSESSING HISTORIC VALUES

The Historic Places Trust has a statutory role under its 1993 Act to assess historic significance, and this makes it the New Zealand authority in this matter. The Department of Conservation adopts the Trust system and consults with the Trust when required rather than set up its own assessment system. The current Trust assessment criteria are presented in their Registration Proposal form. These criteria are:

Historical, cultural, aesthetic, archaeological, architectural, scientific, social, spiritual, technological and traditional significance or value.

1.5 DEVELOPING THIS PLAN

The Department of Conservation, Wellington Conservancy, commissioned Chris Cochran (Conservation Architect) & Russell Murray to prepare the architectural components, work-plans and the measured drawings. Richard Nester (Department of Conservation) prepared historical components of the plan. The plan is based on the DOC Conservation Plan SOP.

1.6 CHANGES TO THIS PLAN

Any management proposals, which are not within the scope of this plan, will require a change to the plan before they can be sanctioned. The procedure for making changes to this plan is set out in section 6.3.

2. Heritage description

2.1 HISTORY

The site of the Dominion Observatory consists of the observatory building, the gun emplacement adjacent to it, and the accompanying magazine that currently make up the building's basement.

The building has had three names associated with it since 1907. They are:

- Hector Observatory (1907–1925)
- The Dominion Observatory (1925 - c. 1945)
- Seismological Observatory (c.1945–1995)

For the purposes of this document the name of Dominion Observatory has been used as this name features prominently on the exterior of the building.

2.1.1 The Gardens Battery

The Gardens Battery was built to supplement 5 existing harbour defences built during the period of the Russian Scare. The main purpose was to provide cover for an area outside the range of the guns at Ngauranga, Kaiwharawhara and Point Halswell Batteries. The idea had emerged from a report by Major General H. Schaw, a retired Deputy Inspector General of Fortifications from the United Kingdom, commissioned to identify weaknesses in the country's coastal defences.

Based on his recommendation a 7 inch RML gun from Auckland was secured and the Gun emplacement and powder magazine was built in 1894. The magazine was subsequently modified in 1896 to hold shells and cartridges. The gun itself was never mounted, but placed in the magazine with the aim to install it if it seemed plausible that the country was under the threat of invasion. Associated with the gun emplacement is the Kelburn Scout Hall, which was built as the Gun Commanders house.

By 1904 the gun was obsolete and the threat of invasion had diminished. The battery was disestablished and the gun-pit filled in. The only future military use the gun emplacement would have was to display up to three seized pieces of military ordnance from WWI, (Kelly 1998). These were moved during WWII as it was suggested that from the air, the guns might be seen as a potential target in the event of an enemy air attack.

2.1.2 The Observatory Building – Time service

The sudden death of New Zealand premier Richard John Seddon, resulted in the Colonial observatory having to cease its time measuring operations and vacate the site adjacent to the Bolton St cemetery that it had occupied since 1864. This was to make way for Seddon's tomb and memorial. Records show that the observatory and the last items of equipment were dismantled on the morning of 21 June 1906, the day of R.J. Seddon's funeral.

The Colonial Observatory moved to a site on the grounds of the wooden Government Buildings whilst plans for a new purpose built observatory building

were prepared. John Campbell, a prominent architect within the Public Works Department, was given the job of designing the building.

A site located over the Gardens Battery Magazine was chosen, and the Dominion Observatory was completed in 1907. The building was named the Hector Observatory by the then Director, Augustus Hamilton, in honour of Dr James Hector, director for the Colonial Observatory from 1869 till his retirement in 1903.

The New Zealand Government Time Service was under the administration of the Department of Internal Affairs. The main function of the Observatory was to provide an accurate time service for civil purposes using astronomical observations. In 1911, Charles Edward Adams was appointed Astronomical Observer and used this position to develop his own personal interest in astronomy, becoming government astronomer in early 1912.

In 1911, at Adams's suggestion, the waterfront time-ball used to provide accurate time for shipping since 1862 was changed to a coloured light system erected on a large mast outside the observatory that could be seen from the harbour. A direct cable link was also set up from the observatory to the Old Government Buildings so that Parliament and the country's civil servants would be consistently on time. By 1916, the use of time signals by radio link was adopted which eventually led to the introduction in 1937 of the familiar six pips that are played on the hour on National Radio.

In 1925 the Hector Observatory changed name to the Dominion Observatory to reflect the country's then newly created status within the Commonwealth. It was also during this year that the government combined the services of all the scientific activities that it administered to form the Department of Scientific and Industrial Research (DSIR).

2.1.3 Seismological study

George Hogben was New Zealand's first recognised government seismologist. Hogben imported and installed a Milne pendulum seismograph at his home after constant pressure to the government to purchase such an instrument. By 1916 Hogben could no longer maintain the machine due to poor health and the instrument was relocated to the shell store basement. As a result Dr Adams was given the added role of Government seismologist. The servicing of the instrument was given to a newly appointed cadet, Robert Cecil Hayes who would later feature as one of New Zealand's pre-eminent seismologists.

Seismology during this period was a very new field of scientific study and opportunities for research were limited and under-resourced. The few items of seismological equipment were not suitable to study local seismic events. Suggestions were even made that the likelihood of a severe earthquake to hit New Zealand would be most improbable since the last major quake to hit a populated area happened in 1855 in Wellington. This was by now outside the living memory of most people at the time and therefore the threat seemed very insignificant. As a result the ability to study local earthquakes was severely restricted.

However a major earthquake in 1929 at Murchison resulted in the deaths of 17 people. New equipment was approved for both the Dominion Observatory and also the Magnetic Observatory in Christchurch. The seismographs were installed in 1930, fortunately just in time for the 1931 Hawke's Bay earthquake, New Zealand's

worst natural disaster in recent history (Hayes 1987). This left the two major towns of Napier and Hastings all but destroyed and resulted in 256 deaths. The overall effect convinced everyone that the threat earthquakes posed to New Zealand's population was indeed very real.

As a result the majority of work at the observatory from the early 1930s on was dedicated to the recording and study of seismic events in both New Zealand and overseas. All astronomical observations were finally handed over to the Carter Observatory in 1945. By this time the Dominion Observatory was called the Seismological Observatory as it was used primarily for seismological study until the Institute of Geological and Nuclear Sciences vacated the site in 1995.

2.2 ORIGINAL PHYSICAL FEATURES

The physical features that make up the structure known today as the Dominion Observatory date from three distinct times. These are:

1894

The Garden Battery, today forming the basement of the Observatory building. The Battery comprised a gun emplacement, barbette pit, observation post, loading gallery and magazine. The gun emplacement shows today on the ground surface as a semicircular nib of concrete, being the top of the gun emplacement walls; the observation post is now occupied by the astrolabe dome; the loading gallery is spaces B1, B2 and B3 (sheet A2), while the magazine is spaces B4 to B12 (sheet A2).

Reference

Drawing held by DOC - Wellington

- New Zealand Defences Wellington Gardens Battery
  'Sketch shewing [sic] proposed alteration to Magazine' - 10 Sep 96
  Ink on linen

1907

The Dominion Observatory, comprising the single-storey eastern-most portion of the building and the two-storey portion with the turret roof. The original Observatory comprised the spaces G2 to G6 (sheet A3) and space U1 (sheet A4).

This was built slightly overlapping the subterranean walls of the magazine that was part of the Botanic Garden Battery. There was no connection between the two buildings, and no reason is known for their odd juxtaposition. Original drawings do not include any acknowledgement of the existence of the magazine or battery.

References

Drawings at National Archives

- PWD 22262, 6 September 1906
  'New Observatory, Wellington' Sheet No 1
  Traced by A T Ford, July 1906
  Ink on linen

- PWD 22262, 11 October 1906
  'New Observatory, Wellington' Sheet No 1, 2
  John Campbell, Government Architect
  Watercolour on cartridge paper

1926

Observatory Extension, today the single-storey portion extending west of the 1907 building. The Extension comprised the spaces G1, and G7 to G12 on sheet A3.

The Extension was built over the subterranean walls of the magazine of the Battery, its exterior walls lining up with the Battery walls below. This accounts for the unusual angle (approximately 13½°) between the two parts of the building. Although there is close structural connection between the two parts, no access between them is shown on the 1924 drawing.

Reference
Drawing held by DOC, Wellington
- PW/WDO No 3018, 18 September 1924
  'The Observatory, Wellington, Proposed Addition'.

Of these three main composite parts, the earliest, the Botanic Garden Battery is barely visible above ground. The outer rim of the concrete emplacement that would have housed the 7"RML gun is visible at ground level, while the ammunition store at the north end of the complex is below and forms the foundations of the 1926 wing of the Observatory. In between, modern subterranean rooms utilising some of the walls of the battery protrude above ground level and the roof of this portion can be walked over. The structure of the Battery is mass concrete with some walls in brick; some modern work is in reinforced concrete, cast against plywood formwork.

The later two parts, the Observatory of 1907 and the west wing extension of 1926, read as though they were constructed at the same time as the materials and construction details match very closely. However, there is a difference evident in the interior in the finishing materials and details.

Exterior

The main structural and weatherproofing materials for both the 1907 and 1926 parts are:

• Foundations	Concrete. The foundations of the extension are largely the masonry walls of the magazine
• Walls	Cavity brick with plastered concrete bands; quoin blocks in limestone (Oamaru stone?)
• Parapet	Plastered concrete, also possibly some limestone
• Ground floor	Concrete
• First floor	Timber
• Front door	Panelled timber
• Window joinery	Timber, double-hung sashes
• Roof framing	Timber
• Roof cladding to turret	Slate
• Roof cladding to flat roofs	Butynol (modern)
• Downpipes	Rectangular section cast iron, 7 no, made by Lukes, Glasgow

Interior

The interior spaces of the Observatory are identified with a number, prefixed B for basement, G for ground floor and U for upper floor (refer to Building plans, Appendix 1). Room uses are identified where they are known, and the date that is given is for the time of construction even if the space has subsequently been modified.

Space B1, Entry, 1894

• Ceiling	Concrete, cast against plywood, modern
• Walls	Concrete, cast against plywood, modern
• Curved wall (northwest)	Plastered brick, historic
• Floor	Concrete, modern

Space B2, 1894

• Ceiling	Concrete, cast against plywood, modern
• Walls	Concrete, cast against plywood, modern
• Alcove on the east wall	Concrete, cast against boxing, historic
• Floor	Concrete, modern
• Fittings	Stainless steel bench, modern

Space B3, 1894

• Ceiling	Concrete, cast against plywood, modern
• Walls	Concrete, cast against plywood, modern
• Floor	Concrete, modern
• Fittings	Timber shelving, modern

Space B4, Tunnel, 1894

• Ceiling	Concrete walls, plastered, historic
• Walls	Concrete, plastered, historic
• Floor	Concrete, historic
• Fittings	Timber shelving, modern

Spaces B5/B6, 1894

• Ceiling	Concrete, plastered, historic
• Walls	Concrete, plastered, and painted brick, historic
• Floor	Concrete, historic
• Fittings	
• Partition separating B5/B6	Timber, modern

Space B7, Shell Store and Seismograph Room, 1896

• Ceiling	Concrete, historic
• Walls	Painted Brick, historic
• Floor	Concrete, historic
• Fittings	Concrete plinth for mounting equipment: historic

Space B8, Cartridge Store, 1896

• Ceiling	Concrete, historic
• Walls	Painted Brick, historic
• Floor	Concrete, historic
• Fittings	Pit in floor with timber hatch cover: historic

Spaces B9/B10, 1894

• Ceiling	Concrete, plastered, historic
• Walls	Concrete, plastered, and painted brick, historic
• Floor	Concrete, historic
• Fittings	Partition separating B9/B10: timber, modern

Spaces B11/B12, 1894

• Ceiling	Concrete, historic
• Walls	Painted Brick, historic
• Floor	Concrete, historic
• Fittings	Partition separating B11/B12: timber and glass, modern
	Concrete plinths for mounting equipment: historic

Space B13

This space is a pit under the floor of space G5. It has not been inspected other than by torch from above. It appears that there is no connection through to other basement spaces.

Space G1, Entry, 1926

• Ceiling	Fibrous plaster, battened, historic
• Walls	Solid plaster, historic
• Floor	Lino (modern), on timber, historic

Space G2, Hall and Stair, 1907

• Ceiling	Solid plaster, historic
• Walls	Solid plaster, historic
	Plain solid plaster architraves and skirtings, historic
• Floor	Lino (modern), on concrete, historic
• Stair	Timber stair, historic

Space G3, Clock Room, 1907

• Ceiling	Solid plaster, historic
• Walls	Solid plaster, historic
	Plain solid plaster architraves and skirtings, historic
• Floor	Lino (modern), on concrete, historic
• Stair	Timber stair, historic

Space G4, Transit Room, 1907

• Ceiling	Solid plaster, historic
• Walls	Solid plaster, historic
	Plain solid plaster architraves and skirtings, historic
• Floor	Vinyl (modern), on concrete, historic
• Fittings	Mechanism for opening roof: historic
	Bench and shelves: modern
	The position of the transit instrument mounted in this room (as taken from a card which was

	pinned on the notice board, and now with DOC) was: Lat 41° 17' 03.8" S Long 174° 45' 59.5" E The height to the top of the transit pier was 415.643 feet above sea level 1909.
Space G5, 1907	
• Ceiling	Solid plaster, historic
• Walls	Solid plaster, historic
• Floor	Vinyl (modern) on timber, historic
Space G6, Toilet, 1907	
• Ceiling	Solid plaster, historic
• Walls	Solid plaster, historic
• Floor	Vinyl (modern), on concrete, historic
• Fittings	Wash hand basin, toilet cistern: historic Zip heater, wc pan: modern
Space G7, Workshop, 1926	
• Ceiling	Fibrous plaster, battened, historic
• Walls	Solid plaster, historic Timber and glass screen, historic Plain timber skirtings and architraves, historic
• Floor	Lino (modern), on timber, historic
• Fittings	Bench, tool board and shelves, modern
Spaces G8/G9, 1926	
• Ceiling	Fibrous plaster, battened, historic
• Walls	Solid plaster, historic Plain timber skirtings and architraves, historic
• Floor	Lino (modern), on timber, historic
• Fittings	Benches, modern Partition separating G8/G9: timber, modern
Space G10, 1926	
• Ceiling	Fibrous plaster, battened, historic
• Walls	Solid plaster, historic Emblem and date in solid plaster, historic Plain timber skirtings and architraves, historic
• Floor	Lino (modern), on timber, historic
Spaces G11/G12, 1926	
• Ceiling	Fibrous plaster, battened, historic
• Walls	Solid plaster, historic Plain timber skirtings and architraves: historic
• Floor	Lino (modern), on timber, historic
• Fittings	Benches: modern Partition separating G8/G9: timber, modern
Space U1, Office and Tea Room, 1907	
• Ceiling	Tongue and groove boarding, painted, historic Ovolo moulded timber cornice, painted, historic

• Walls	Solid plaster, historic
	Moulded timber architraves, painted, historic
• Floor	Vinyl (modern), on timber, historic
	Plain profile timber skirting, historic
• Fittings	Bench: modern
	Stair newel post: painted timber, historic

Door joinery

The door joinery is evidence of changing styles, with some original doors still in place and some of modern origin. Following is a summary of door styles and probable ages.

DOOR	STYLE	DATE	NOTES
D1	5 panel exterior door	1907	(shows on 1907 drawings, relocated to present position in 1924)
D2	missing		(relocated to D1 in 1924)
D3	5 panel	1907	(shows on 1907 drawings)
D4	2 panel, glazed	1907	(shows on 1907 drawings)
D5	4 panel	1907	(shows on 1907 drawings)
D6	4 panel	1907	
D7	flush	modern	
D8	5 panel, fanlight	1926	
D9	missing		(shows as 5 panel door on 1924 drawings)
D10	flush	modern	
D11	5 panel, fanlight	1926	(shows on 1924 drawings)
D12	5 panel	1926	(shows on 1924 drawings)
D13	flush	modern	
D14	flush	modern	
D15	flush	modern	
D16	flush	modern	
D17	flush	modern	
D18	framed, vertical t & g	1894	Shell Store
D19	framed, vertical t & g	1894	Cartridge Store
D20	4 panel door, cut down	?	
D21	flush	modern	
D22	framed, vertical t & g	?	
D23	glazed	modern.	

2.3 PHYSICAL MODIFICATIONS

Within the framework of the three important stages of construction, numerous small scale modifications have been carried out to the building. Known changes are set out below.

1896

The 'Old Magazine' of the Botanic Garden Battery was modified by building new walls within it. These formed a 'Shell Store' and a 'Cartridge Store' with a small passage between. The Shell Store has since been enlarged to take in the passage, while the other walls remain unaltered from 1896.

Reference

Drawing held by Department of Conservation, Wellington Conservancy.

- 'New Zealand Defences, Wellington, Gardens Battery'
  Sketch showing proposed alterations to Magazine
  10 September 1896.

1922

A two-roomed, timber-framed building was proposed to be built at basement level, in the area near the bottom of the flight of steps down to the battery. It is known that this was built as it shows in an early photo (see *In Spite of His Time*, Margaret Hayes, NZ Geophysical Society, 1987, p 55) but today there are no physical remains of it.

Reference

Drawing at National Archives

- 'Proposed Alterations for Seismograph House'
  PWD 53815, WDO 2209, 16 February 1922.

Date not known (1930s?)

Hatch formed in floor of space G10 with ladder access down to basement.

Reference

Hatch and ladder are not shown on the drawings for the Extension of 1924.

Date not known

Plinths for mounting seismographs and other instruments installed in spaces B7 and B12.

Reference

These plinths are clearly related to science and not to defence.

Date not known (1950s?)

Partition erected to form two spaces G8 and G9.
Partition erected to form two spaces G11 and G12.

Reference
The partitions are not shown on the drawings for the Extension of 1924. On-site examination shows that the joinery of the partitions is modern, and there are plaster ceilings with the pattern of battens laid out for the larger spaces.

Date not known (1950s?)

Spaces B1, B2 and B3 subdivided.

Reference
Construction of walls and roof in this area is modern, with the concrete having been poured against plywood shuttering.

Date not known (1950s?)

Partition erected to form space B6.
Partition erected to form space B10.

Reference
On-site examination. Inspection shows the construction and door joinery to be modern.

Joinery fittings

There are numerous items of joinery throughout the building, including work benches and shelves. These have clearly been added over time, although none appear to be contemporary with the time of construction 1907 or 1926.

Service wiring

As would be expected over the 90 year life of a building in scientific use, numerous additions of electrical and service wiring have been made. Without provision in the original design for such services, there is now a plethora of surface-run wiring which detracts from the appearance of most internal spaces.

Maintenance

Maintenance has of course been carried out over the life of the building. Mostly this work has little significance in terms of the fabric that remains today, but it can have minor technical interest in some cases. Examples of records of maintenance or modification work are as follows (these are taken from 24/85 Hector Observatory file, Part 1, held by National Archives):

April 1914

Copper dome to (be made to) revolve easily.

Alterations of dome to open to zenith.
Easy means of opening shutter.
Hobs in Oamaru stone, also iron pipes painted.
Transit house to be made rat proof.
New weather bar put on to main door.
New letter box, also brass letter plate repaired.

August 1917

Collimators erected.

March 1918

400 gallon water tank has settled and cracked the concrete drains.
The ground round the collimators has sunk and requires filling.
Roof in cellar is leaking. (April 1918, approved expenditure of £24 to fix same.)

June 1918

Cellar (seismograph room) leaking again.

3. Information sources

3.1 HERITAGE PLANS

10 Sep 1896 New Zealand Defences, Wellington, Gardens Battery. Sketch shewing [sic] proposed alteration to magazine.

3.2 MEASURED DRAWINGS

Cochran, Chris. 1999. Dominion Observatory Kelburn Wellington, June 1999. Scale varies

3.3 HERITAGE PHOTOGRAPHS

Alexander Turnbull Library

- Wellington, Dominion Observatory, c.1936, neg.162310. E. M. Tiller donation.
- Wellington, Dominion Observatory, 1978, neg.WCC F-21. Wellington City Council Collection.
- Wellington, Dominion Observatory, 1978, neg.WCC F-23. Wellington City Council Collection.

- Wellington, Observatory Reserve, 1978, neg.WCC F-24. Wellington City Council Collection.
- Wellington, Dominion Observatory, 1978, neg.WCC F-25. Wellington City Council Collection.
- Wellington, Kelburn Meteorological Office, 1930, EP5220. Evening Post Collection.
- Wellington, Kelburn Meteorological Office, 1930, GEP2845. Evening Post Collection.
- Wellington, Kelburn Meteorological Office, 1930, GEP5218. Evening Post Collection.
- Wellington, Kelburn Meteorological Office, c.1945, 55883Ω.

3.4 PHOTOGRAPHIC RECORD

- Cochran, Chris. 1999. Set of 61 - taken June 1999.

3.5 WRITTEN ARCHIVES - PRIMARY SOURCES

Army Department

- AD 1 5/1 Cottage - Gardens Battery Kelburne
- AD 62/1 Harbour Defences - General Memorandum on the Defences of New Zealand.
- AD 66 folder 20 item 2897 Plan 'Old Fort Kelburne (Gardens Battery)

Department of Scientific and Industrial Research Files

- SIR 1 49/15/5 Accommodation - Seismological Observatory 23/5/1912 - 31/12/1945

Ministry of External Affairs

- EA 1 85/6/4 Kelburne Observatory Gun Emplacement

Public Works Department

- W 1 24/85 Hector Observatory - Kelburn pt.1
- W 1 24/85 Hector Observatory - Kelburn pt.2

3.6 WRITTEN ARCHIVES - SECONDARY SOURCES

- Galbreath, R. A. 1998. *DSIR: making science work for New Zealand.* Victoria University Press in association with the Historical Branch, Dept. of Internal Affairs, Wellington.
- Hayes, Margaret. 1987. In Spite of his Time: A biography of R. C. Hayes, pioneer seismologist astronomer musician. The New Zealand Geophysical Society, Wellington.

4. Significance

4.1 HISTORICAL SIGNIFICANCE

Gardens gun emplacement

This area represents a site that demonstrates New Zealand's early attempts to counteract threats from foreign shores. Although not of high strategic importance as far as the early Coastal Defence Network is concerned, it nevertheless is a reasonably intact representation of an easily accessible Russian Scare Defence Site, complete with original gun commanders house, observation post and magazines.

Observatory building – time keeping

From 1907 the Dominion Observatory was New Zealand's primary site for developing and recording NZ Standard time. This was done first by astronomical observation, then by wireless link to other observatories, and finally by the use of atomic clocks. Such recording gave rise to New Zealand's own identity in spatial time and place relative to the rest of the world. This helped improve nation-wide surveying and navigation ability. The building was also a part of global network of time keeping observatories, therefore giving this building high values in both national and international significance.

Observatory building – seismological study

The Dominion Observatory is where the New Zealand Governments first official and departmentalised approach to the study and recording of seismic events around New Zealand occurred. The recordings and studies made from the Dominion Observatory throughout the 20th Century have demonstrated the devastating and powerful effect that earthquakes have had in creating and continually modifying this country. Such study has had a huge impact on everyday lives, from determining building standards through to educational promotion on how best to survive major seismic events.

Association with prominent people

Some of New Zealand's most prominent pioneering scientists associated with the fields of astronomy, seismology and physics have been closely associated with the Dominion Observatory.

The Observatory was initially named after Sir James Hector, director of the Colonial Observatory from 1869 till 1903 and considered the founder of scientific research in New Zealand.

Dr. Charles Edwin Adams was appointed to the Observatory in 1911 where he worked till 1936. It was Adams work in astronomy that gained him fame as one of New Zealand's most important scientists. He later laid the groundwork in New Zealand for the developing science of seismology during the early 1920s. He founded and was president of the New Zealand Astronomical Society (now the Royal Astronomical Society of New Zealand), was an associate in astronomy at Yale

University and a fellow of the Royal Astronomical Society, London. He was also instrumental in establishing the Wellington based Carter Observatory.

Robert Cecil Hayes was personally trained by Adams and went on to become arguably New Zealand's foremost pioneer seismologist having been awarded the Hector Award in 1975 from the Royal Society of New Zealand 'for pioneer research on seismology in New Zealand'. Hayes started work at the observatory as a professional cadet in 1920 at the age of 20 and worked almost consistently with the observatory until his retirement in 1960.

During this time some of his notable achievements at the observatory involved working in conjunction with Dr Richter who was based in California and designed the Richter system for assessing the magnitude of earthquakes events. Hayes was able to implement the Richter system in New Zealand and confirm that it worked equally well outside of California.

Hayes work was also able to help prove the theory that deep centred earthquakes (a reasonably frequent event in New Zealand) were in fact a reality and not just anomalies as previously believed by other international seismologists. This information would later help in understanding the principle of plate tectonics and the movement of large landmasses across the earth's surface.

4.2 PHYSICAL SIGNIFICANCE

The physical attributes of the Dominion Observatory render it a highly significant building in the Wellington and national context. Significance is defined under archaeological, architectural, technical and landscape headings.

Archaeological significance

In terms of the Historic Places Act 1993, the Observatory is an archaeological site since it "was associated with human activity that occurred before 1900" (section 2).

In particular, the area of the gun emplacement, which is now represented on the ground surface by the top of the outer wall of the enclosure, could reveal evidence of the nature, extent and technical design of the Botanic Garden Battery. This would require a full archaeological investigation and is beyond the scope of any present plans. However, it may be pertinent to take this into account if, for example, the carpark area is to be modified.

Architectural significance

The Observatory is a work of architectural distinction, designed by the Government Architect John Campbell in an Edwardian Baroque style. Campbell made this style popular throughout the country in the first decade of the 20th century with the construction of many post offices, courthouses and other Government buildings. The style is characterised by a flamboyant use of Classical motifs and it is well seen in several other contemporary Wellington buildings to Campbell's design, the Public Trust Building (designed in 1905) and Parliament Buildings (1910). The design of the Observatory is more restrained than the Public Trust, with controlled use of

quoins at the corners and Gibbs surrounds to doors and windows. (A Gibbs surround, named after the early 18th century architect James Gibbs, is a door or window architrave punctuated with large blocks of stone that give the appearance of quoins.) Elongated keystones over the window openings and wreaths of foliage are other Classical elements. All these features figure strongly in the design as they are executed in (painted) plaster which forms a marked contrast with the red brick, the main structural material of the building.

The Observatory is two storeys above ground. The ground floor is unified by a sloping plinth that anchors the building to the ground, and by a horizontal parapet that is only broken for a short length on the north side. The first floor is a single octagonal room, sitting within the parapet. The turret roof to this floor, emphasised by a tall finial on top, is a strong focus to the composition, offsetting the severely horizontal character of the parapet to the single-storey parts of the building.

The colours and textures of the exterior of the Observatory enhance its architectural qualities. While red brick and plaster predominate, the timber door and windows, slate roof and lead flashings contribute to the overall feeling of care in design and permanence that befits a scientific research institution.

The architect John Campbell (1857–1942) served his articles under John Gordon (c. 1835–1912) in Glasgow. He arrived in Dunedin in 1882 and, after a brief period as a draughtsman with Mason and Wales, joined the Dunedin branch of the Public Works Department in 1883. His first known work, an unbuilt design for the Dunedin Railway Station, reveals an early interest in Baroque architecture.

In November 1888 Campbell was transferred to Wellington where, in 1889, he took up the position of draughtsman-in-charge of the Public Buildings Division of the Public Works Department. Then, following his appointment as Government Architect in 1890, he was in charge of the design of government buildings throughout New Zealand until his retirement in 1922. Government architecture designed under his aegis evidences a change in style from Queen Anne to Edwardian Baroque. His best known Queen Anne design is the Dunedin Police Station (1895–96), modelled on Richard Norman Shaw's New Scotland Yard (1887–90). His best Edwardian Baroque building is the Public Trust Office, Wellington (1905–09). Although Campbell designed the Dunedin Law Courts (1899–1902) in the Gothic style, he had, by c. 1903, established Edwardian Baroque as the government style for police stations, courthouses and post offices throughout New Zealand. In 1911 Campbell and Claude Paton jointly won the national architectural competition for the design of Parliament Buildings, Wellington. Although only partially completed, Parliament House is the crowning achievement of Campbell's career.

Coincidentally, John Campbell lived near the Dominion Observatory at 21 Salamanca Road; his house is still standing today.

Technical significance

There are two aspects of the technical significance of the Observatory. The first is the technical knowledge that can be derived from a study of the building fabric. The composition and source of materials, their detailing and use, and their degradation over time are some of the items of information that can be obtained. Elements of particular technical interest for these reasons are:

- The mass concrete construction of the late 19th century battery, basement
- The cavity brick construction, ground and upper floors
- The limestone built into the walls as quoin blocks etc
- The floor and roof framing in timber, space U1
- The roof slating and lead-work, turret roof
- The decorative plaster work, exterior and also in space G10

The other aspect of technical significance is related to the use of the building for scientific research. The Observatory has played an important role in the study of astronomy and seismology in particular, and remnants of this work are still evident. Elements of particular technical interest for this scientific reason are:

- Roof opening mechanism, space G4.
- Plinths for mounting seismographs and other instruments, spaces B7 and B12.

Landscape significance

The landscape setting of the Dominion Observatory is one of the most dramatic in the city of Wellington. The building commands a huge view of the city and harbour to the north-east and east with the Hutt Valley and the Tararua and Rimutaka ranges clearly visible. Around to the south the view is closer, of trees and associated buildings, while to the west and north the ground drops away steeply and there are views out over the Botanic Gardens to the Tinakori Hills.

While a part of Kelburn, given its close proximity to Upland Road and the top of the Cable Car, no residential buildings form part of its close visual context.

Instead, the built context is one of intense scientific and historic interest. Clockwise from the north-west, the buildings adjacent and visually linked to the Dominion Observatory are:

Metservice buildings (northeast)

Closest is a low-rise timber framed building at 32 Salamanca Road. This has been built in various stages, the earliest part dating from 1930, and although it comes close to the Observatory it is much lower and the view out is over its roofs. The main four-storey Metservice building in reinforced concrete is prominent in the view to the northeast.

Lawson Scout Hall (south)

This is a single-storey timber building, which was built at the time of the Gardens Battery. It is now the oldest scout hall in New Zealand, having been the home of the first Kelburn Scout Group since 1913. It is very discreetly sited in relation to the Observatory, being well down and among mature trees.

Cable car (southwest)

The top of the cable car, and in particular the trellised domes over the restaurant, are just visible through trees.

Climatological enclosure (southwest)

This is a prominent and close neighbour to the Observatory. It was established on this site in 1928 and continuous climatic records have been kept from this time. Records are kept of rainfall, air temperature, sunshine, air pressure, wind speed and direction, earth temperatures and evaporation. The enclosure is literally that, a high wire-mesh fence with a small weatherboarded shed at the entrance.

Thomas King Observatory (southwest)

This is a single-storey timber-framed building with an observatory dome. It occupies the very highest point of the Botanic Gardens, looking down on the Climatological Enclosure and the Observatory. It was built in 1912 and is still in use today. Alongside the observatory are two plinths, one marked 'Astro Station 1980, Lands and Survey Department'.

Carter Observatory (west-southwest)

The Carter Observatory is New Zealand's National Observatory, its charter being:

- To conduct original astronomical research
- To provide a national astronomical education service
- To provide a national public astronomy service
- To assist in the preservation of New Zealand's astronomical heritage

It was built in 1941, the design by architect William Gray Young, in a restrained Georgian style although two astronomical domes are the main distinguishing features of it. The Carter is a little lower than the Dominion Observatory, and the two buildings are visible to each other through trees.

Other features

Four other features are closely associated in use with the Observatory itself, although physically detached from it.

Bunker

To the north is a concrete bunker, with steps leading down to it from the open space in front of the Observatory. It has a flat concrete roof, which is the only element visible from above.

Mast

To the northeast, a tall timber mast of relatively modern origin holds a wind speed measuring device. It stands in the position (or close to the position) of the mast that relayed time signals for shipping (see photo in *In Spite of His Time*, p. 55), and it is a reflection of an important historic structure for that reason.

Survey peg

A survey peg, known as the Lawn Peg, is situated just east of the Battery and near the astrolabe. Its position is:
Lat 41° 17' 10.0141" S
Long 174° 46' 05.7913" E

This information is taken from a card dated 17 February 1967 which was pinned on the notice board in the Observatory. This is now with DOC.

Astrolabe

The dome containing the astrolabe is built into the walls that formed the observation post at the southern extremity of the Battery. Because of the use of the astrolabe during the International Geophysical Year (1957/58) the position of the centre of the dome "is known more accurately worldwide than any other point in New Zealand" (words taken from the sign alongside the astrolabe).

The silver dome of the astrolabe adds to the complex of domes in the scientific precinct at the top of the Botanic Gardens.

5. Threats to heritage

5.1 INTRODUCTION

One key aspect of the management of heritage places is the management of threats, in conjunction with maximising any associated opportunities. The principal categories of threat at the Dominion Observatory are summarised below. The management of these threats will be addressed in the following manner:

- Actions specified below
- General management policies and procedures in section 6
- Project planning and specification processes
- Project approval, implementation, and control processes
- On-going maintenance and monitoring processes

5.2 THREAT MANAGEMENT PRINCIPLES

The following principles will guide the management of threats to heritage at [place name]

- Clear identification of heritage places
- Clear identification of heritage fabric (i.e. material) therein
- Identification of actions and inactions that impact on heritage
- Assessment of adverse effects of these actions and inactions
- Development of solutions that - avoid, remedy or mitigate adverse effects
  - — are sustainable long term
  - — match resource levels available

5.3 LOSS OF USE

Threat

For buildings especially, sustained loss of use poses a significant threat to their very existence. This significant threat is identified in article 7 of the ICOMOS New Zealand Charter. History repeatedly shows how loss of use leads to lack of support

and income, cessation of maintenance, deterioration, vandalism, and eventual demolition. Now that the previous use has ceased, loss of use is a significant management issue to be addressed.

Action

Compatible new uses will be actively investigated and implemented as a matter of high priority.

5.4 DECAY PROCESSES

Threat

Natural decay processes pose an ongoing threat to a wide range of materials at this site. At the Dominion Observatory the extreme dampness has significant adverse effects.

Action

Rates of decay will be minimised by conservation work, both repairs and regular maintenance. This work may need to include design modifications and the introduction of modern material conservation technologies. Requirements will be specifically addressed on an issue by issue basis in this plan.

5.5 INCOMPATIBLE NEW USE

Threat

An incompatible new use is one which impacts adversely and irreversibly on the heritage values of a place. It can result in the destruction of large amounts of significant fabric, and destroy visual integrity.

Action

A range of new use options should be investigated and compared. Approval of new uses should be based on those that minimise adverse effects on heritage values, while being sustainable, and preferably generate at least sufficient income to cover long term maintenance costs.

5.6 CONSERVATION AND ADAPTATION WORKS

Threat

Historic conservation work where misguided, both repairs and maintenance, can adversely effect heritage values. Adaptation works frequently impact adversely on heritage values.

Action

Prepare conservation plans and detailed work specifications to guide conservation work so as to minimise adverse effects. Employed sufficiently skilled workers and supervise work to ensure (1) approved plans are adhered to and quality standards met, and (2) control variations arising while work is in progress.

5.7 DISASTERS

Threat

Principal disasters to threaten this building are damage from earthquakes and fire within the masonry building.

Action

The response to disaster threats will be included within the scope of conservation plans, and addressed as part of repair work and regular maintenance regimes.

5.8 INFORMATION LOSS

Threat

The destruction of important archival sources such as old documents, letters, diaries, plans and photographs. The loss of oral history sources with the death of people directly involved in the history of the Dominion Observatory.

Action

Undertake a research project to locate and protect archives at risk, and to interview and record key oral sources.

5.9 RE-VEGETATION

Threat

Trees being replanted close to the Dominion Observatory on a large scale. Trees can adversely affect heritage values as their roots systems develop and disrupt archaeological sites. A greater threat would be reduced aesthetic values

Action

Zones of high archaeological and historic value will be mapped and planting programmes designed to avoid adverse effects.

5.10 VISITORS IMPACTS

Threat

Threats arising from visitors are identified in this section. This includes assessing traffic impacts of high visitor numbers and any requirements for control. Deliberate destruction such as vandalism, theft, and arson threats are also addressed here.

Action

Identify and assess the range of remedies including: deliberately not publicising the place; entry control; boundary and site security; signage, and barriers; staff, concessionaire, or volunteer presence; and on-site information.

5.11 PUBLIC SUPPORT

Threat

The long term public preservation of a historic place requires public understanding, support, and involvement. If this is absent it may be difficult to sustain the required level of core funding.

Action

Publicise the Department's work conserving this historic heritage and encourage public visitation. Ensure that the heritage of the Dominion Observatory is interpreted to visitors in an effective way. Involve volunteers in repair and maintenance projects wherever possible.

6. Management policies

The following policies will guide the protection, conservation and use of the Dominion Observatory.

6.1 STANDARDS OF CONSERVATION (ICOMOS CHARTER)

The international organisation, which develops conservation policies, is ICOMOS, the International Committee on Monuments and Sites. It has established an International Charter of guiding principles, and the New Zealand derivation of that is the ICOMOS New Zealand Charter 1993. A copy of the charter is kept in DOC's Wellington Conservancy office. The standards of the charter will guide the management of the Dominion Observatory; however this policy does not constitute official ICOMOS endorsement of this plan.

6.2 PLANNING FOR CONSERVATION WORK

Planning for all conservation work on this historic place will be guided by a plan consistent with the principles of the ICOMOS New Zealand Charter. The terminology used in that charter will be adopted. Conservation work involves both remedial work and regular maintenance which are undertaken to safeguard heritage values. Remedial work generally addresses the cumulative effects of deferred maintenance, while regular maintenance minimises the future effects of injurious natural processes.

6.3 CHANGES TO THIS PLAN

If new management proposals arise that are outside the scope of this present plan, the plan must first be revised and approved before the proposals may proceed. This may require revised or additional policies in this section. The section on significant fabric provides guidelines for assessing any future adaptation proposals. If the new management proposals prove to be inconsistent with the ICOMOS NZ Charter, they cannot proceed.

6.4 LEGAL STATUS

Management must be consistent with the requirements of applicable legislation:

- *Conservation Act 1987*: Meets requirements of an Actively Managed Historic Place as an Conservancy Conservation Management Strategy (CMS).
- *Historic Places Act 1993*: Registered as a category 1 historic place.
- *Resource Management Act 1991*: Listed on the local District Scheme.

6.5 RESEARCH

Planning for conservation work will be based on adequate and reliable information being first obtained and critically analysed. The main sources of information are archival, oral, and examination of the place itself. Sufficient information has been gathered and analysed to provide a sound basis for this plan and its conservation recommendations.

6.6 SKILLS

Conservation planning and work can require special skills. Where those skills are available within the Department they may be utilised. Otherwise suitable outside specialists will be engaged. The skills of special relevance to this project are: carpentry, electrical, plumbing, brickwork, painting, and roofing.

6.7 PERIOD

The Dominion Observatory will be conserved to appear as close as possible to how it appeared in 1926. This policy does not require the removal of any structural elements from the existing complex. Material previously removed from the structure will be returned or replicated only where such material can be regarded as integral to the original structure. (See section 6.11 Repair.)

6.8 INTERVENTION

All conservation work will be undertaken so as to ensure the minimum possible intervention with the historic place as it presently exists. Increasing levels of intervention are defined by ICOMOS as: maintenance, stabilisation, repair, restoration, reconstruction and adaptation.

6.9 MAINTENANCE

Maintenance will be adequate to minimise future deterioration of significant material. The work specified will be funded as required in annual business plans. Maintenance work is the conservation base load for this historic place. The maintenance specification will include a condition monitoring provision that will validate that the maintenance has been adequately provided for and executed.

6.10 STABILISATION

This is the arrest of the processes of decay, and will be the most favoured conservation option because it involves no removal of existing material.

6.11 REPAIR

This is the making good of damaged or decayed material. It will only be used where stabilisation is not possible. Repair of material should be with original or similar materials and to the same standards as original. A technically higher standard of repair may be justified where the life expectancy of the material is increased, the new material is compatible with the old, and the cultural heritage value is not diminished. New material should be identifiable.

6.12 RESTORATION

This involves the reintroduction of genuine material elements which were once part of the place but were later removed.

6.13 RECONSTRUCTION

This involves the introduction of whole elements of new material where loss has occurred. It will only be used where repair and restoration are not possible. Reconstruction should be with original or similar materials and to the same standards as original. A technically higher standard of restoration may be justified where the life expectancy of the element is increased, the new material is compatible with the old, and the cultural heritage value of the place is not diminished. Reconstructed elements should be identifiable.

6.14 ADAPTATION

Adaptation refers to changes required solely to meet continued use requirements. The conservation of a place of heritage value is usually facilitated by it serving a useful purpose and possibly generating some income, and this may require some change. Such change should be determined in the context of a plan meeting ICOMOS principles. In this case alterations and additions are only acceptable where they are essential to continued use. In particular adaptation should not detract from the significant qualities of the place, it should be reversible, and the disturbance of significant material should be kept to a minimum.

6.15 FITTINGS AND CHATTELS

Fittings and chattels that contribute to the heritage value of this place are regarded as an integral part of it and will be conserved with it. A master list of significant fittings and chattels is provided in Chapter 7.

6.16 DISASTER PROVISIONS

To address the disaster type threats identified in 5.2 and 5.3.

6.17 SETTING

The qualities of the setting of this historic place are integral to the authenticity of the place and will be identified and conserved along with the place itself. Together they constitute the heritage setting and appropriate management zone boundaries are identified in this report.

6.18 APPROVED USE

Any change to this use will be reviewed in the light of changed impacts and financial viability, and may require to be sanctioned by a change to the plan (see 6.3).

6.19 VISITOR FACILITIES

Visitor facilities will be designed to maximise the quality of the visitor experience, while avoiding any adverse impacts on the place.

6.20 INTERPRETATION

Interpretation of the significance of this place will be designed to maximise the quality of the visitor understanding and support while encouraging visitors to respect the place.

7. Significant fabric

There has been scientific research work carried out in the Dominion Observatory from the time of its construction until vacated by the Department of Scientific and Industrial Research, a period of 90 years from 1907 to 1997.

The architectural form of the building has not been significantly changed since 1926. Since this time, partitions have been built, internal joinery (work benches and shelves) built in, and electrical services installed. While some of these changes have modest historical interest, none benefit the building architecturally.

It is proposed therefore that the building be restored to its architectural form of 1926, except where a later modification is known to have scientific value.

Section 2.4, Physical modifications, lists two changes that fall into this category:

- Hatch formed in floor of space G10 with ladder access down to basement.
- Plinths for mounting seismographs and other instruments installed in spaces B7 and B12.

Section 2.4, Physical modifications, lists post-1924 modifications that would be reversed under the above policy:

- Partition erected to form two spaces G8 and G9 would be demolished.
- Partition erected to form two spaces G11 and G12 would be demolished.
- Partition erected to form space B6 would be demolished.
- Partition erected to form space B10 would be demolished.
- Joinery fittings would be removed.
- Service wiring would be removed.

Because of the important structural role played by the modern walls that subdivide spaces B1, B2 and B3, and lack of knowledge as to what form the original space took, it is proposed that these modern modifications be left unaltered.

All other fabric, pre-dating 1924, is judged to be of historic significance. It should not be altered or removed except in accordance with policies enunciated in this plan.

8. Remedial work specification

8.1 GENERAL

The condition of the building is assessed in this section, with remedial work scheduled for its various elements. The structural condition of the building, and its capacity to resist horizontal forces generated by earthquakes, has not yet been assessed. There are no records of the structural repair of the building.

All work is to be in accordance with the requirements of the New Zealand Building Code and relevant New Zealand Standards. It must be carried out by qualified tradesmen who are fully conversant with the particular requirements of working on a heritage building.

8.2 CONDITION

The general condition of the Dominion Observatory is good, although having been neglected since the DSIR vacated the building, maintenance work is now needed.

Observed defects in the building are:

Exterior

- Blocked gutters to turret roof
- Rust stains on walls from leaking junctions in gutters to turret roof
- Plant growth around several downpipes, north and south elevations
- Slates loose and missing on turret roof
- Lead flashings loose on turret roof
- Holding down straps for lead flashings rusted
- Moss and lichen growth on horizontal surfaces of parapets and cornice
- Paintwork on plaster stained, peeling
- All windows difficult to operate, or purposely sealed closed

Interior

- Electrical wiring not tested, but parts of it presumed unsafe and/or unable to be reused
- All joinery fittings in rough condition
- Damp conditions in basement, especially in spaces B1, B2 and B3
- Effluorescence and mould on many walls, especially in G4 and basement spaces
- All interior spaces, including all door and window joinery, are in need of redecoration

8.3 REMEDIAL WORK TO ROOF

Remove any cracked or broken slates.

Replace with good quality recycled slates of matching size and colour. Use copper nails and tags. Approximately 30 will be needed.

Check lead flashings and repair as necessary. Four of the ridge flashings will need attention.

Remove all the holding down straps. Clean and paint those that are sound with three-coat semi-gloss water-borne system, Resene spec 5e1.2 or similar, Ameron primer. Make new straps as necessary to matching shapes, galvanise and paint before refixing.

Tidy and refix loose edges of butynol roofing.

8.4 REMEDIAL WORK TO STORMWATER DISPOSAL SYSTEM

Check and clear all rain water heads and downpipes. Remove trees growing from behind north side turret downpipe.

Make up new shrouds for rain water heads where they are missing. (These are covers that help prevent the rain water heads being blocked).

Clean cast iron gutters to turret and downpipes (seven total) and paint with three-coat semi-gloss water-borne system, Resene spec 5e1.2 or similar, Ameron primer. This may mean removing the gutters to the turret to achieve a good finish and to allow joints to be properly sealed.

Rod stormwater drains, one at northwest corner of building and one each on the north and south sides.

8.5 REMEDIAL WORK TO EXTERIOR WALLS

Remove all stray conduits, pipes, etc from the outside of the building. Reinstate terminal vent on south elevation by toilet.

Wash whole of exterior walls, plaster, brickwork and limestone. Use low pressure water and soft brushes to avoid damage to plaster or brick pointing.

Treat with moss and mould killer; wash well.

Carry out repairs to plaster where the original has fallen off, is cracked or drummy. Profiles to be copied from existing work.

Use a plaster mix that replicates the original as closely as possible in terms of strength and texture (colour does not matter). Allow to have a sample of the original plaster analysed by a technical laboratory so that the original mix can be copied as closely as possible.

A possible mix might be approximate:

- Bond coat: 2 : 3 cement : sand
- Flanking coat: 1 : 1 : 6 cement : lime : sand
- Finish coat: 1 : 1 : 6 cement : lime : sand.

Paint plaster with three-coat satin finish water-borne system, Resene spec 1e 1.3 or similar. Colour to be selected.

Check brickwork and carry out minor repointing if necessary. (Behind north elevation turret downpipe repointing may be required.)

Check limestone, carry out minor repairs and re-establish stone as the finished surface or repaint depending on condition. Decision to be made after exterior cleaning is complete.

8.6 REMEDIAL WORK TO EXTERIOR JOINERY

Remove all window sashes.

Carry out any joinery repairs that may be necessary. Use finger jointed radiata pine, treated H3, profiles to match existing.

Remove ultraviolet protective coating from those panes of glass that have it.

Clean and prepare all surfaces of frames and sashes, also front door. Paint with three-coat high-gloss alkyd paint system, Resene spec 2e2.1 or similar.

Reassemble windows to operate smoothly. Renew all sash cords, oil hinges and pulleys, ensure catches are working.

Polish brass letter slot in front door.

8.7 SERVICE WIRING

Strip out redundant wiring, including fixings, throughout the building.

Make good to damaged surfaces.

Rewire to all existing lights, including exterior light.

8.8 INTERIOR CARPENTRY AND JOINERY

Strip out redundant fittings in spaces B2, B3, G4, G7, G8, G11 and G12.

Make good to damaged surfaces.

Demolish partitions between B4/B6, B9/B10, G8/G9 and G11/G12.

Make good to adjacent surfaces, ceilings and walls.

8.9 INTERIOR REDECORATION

Make good to any damaged surfaces using matching material.

Clean and prepare all surfaces.

Paint with the following systems:

- Timber ceiling (U1): three-coat semi-gloss alkyd system, Resene spec 3i1.2 or similar.
- Fibrous plaster ceilings (G1, G7-G12): three-coat satin water-borne system, Resene spec 15i 2.3 or similar.
- Solid plaster ceilings. (G2-G6): three-coat low-sheen water-borne system, Resene spec 15i 2.4 or similar.
- Timber doors, architraves, skirtings: three-coat high-gloss alkyd system, Resene spec 3i 2.1 or similar. (Note, no work is required to doors D18 and D19.)
- Solid plaster, brick and concrete walls, also concrete walls in basement: three-coat low-sheen water-borne system, Resene spec 15i 2.4 or similar.

Note that some surfaces in the basement may be treated first with a water-proofing coating (such as Vandera).

8.10 NEW USE REQUIREMENTS

New use requirements will not be known until a new use (or user) is agreed. In any event, fitting the building for a new function will require all the work set out in preceding sections, and probably the following:

- New fittings
- New services (toilets, kitchen)
- New electrical and service wiring
- New floor coverings to ground and upper floors
- Fire protection (possibly an automatic sprinkler system)

9. Regular maintenance specification

9.1 INTRODUCTION

Planned maintenance is extremely important for a Category I building such as the Dominion Observatory. A regular programme of maintenance means that minor faults are identified early, thus avoiding the need for major repairs in the future. If well maintained, the Observatory is likely to be better used and enjoyed than one that is neglected; it will survive longer, and it is likely to suffer less damage in the event of fire, or a major storm or earthquake.

Maintenance and repairs should be carried out regularly and according to the following guidelines. The notes on materials and methods are particularly relevant to areas of high cultural heritage value, but are generally applicable to modern work as well. A separate document detailing the maintenance schedule and instructions has been prepared (Cochran 2002).

9.2 MATERIALS

Use materials that match adjoining fabric as closely as possible. Where the original material is not available (and this should always be the first choice) choose a material that has properties of strength, profile, texture and colour that are as close as possible to those of the original.

Use materials that have as long a life as existing or adjacent work.

Some appropriate materials are:

• Roof	Roof slates, Countess size, 510 x 255.
• Gutters and downpipes	Cast iron, ogee section gutters and rectangular section downpipes.
• Wall surfaces	Painted plaster to match original.
• Windows	Timber windows, to match existing.
• Hardware	To match original hardware as closely as possible.
• Plumbing	Copper where visible.
• Original ceilings	Solid plaster or fibrous plaster to match existing.
• Original wall surfaces	Solid plaster to match existing.
• Interior joinery and finishing timbers	Generally, all timber is painted

9.3 METHODS

Match the standards of workmanship that are evident in the adjacent work. In some cases this will mean copying traditional trade practices.

9.4 PERSONNEL

It is important to have suitably qualified and well briefed personnel for maintenance and repair work.

Trades people

Building work should be carried out by qualified tradespeople, working to a clear brief and under the supervision of appropriately qualified personnel.

Inspector

Inspections should be carried out by personnel with a building trade or design background. The user of a building is always a vital source of information about its condition, since some defects are quickly apparent. Lessees should therefore be briefed to keep a log where defects are noted for action by the inspector.

Architect

Major maintenance and new design work should be carried out by a professionally qualified architect, in conjunction with engineers, quantity surveyors and others as required.

9.5 MAINTENANCE LOG

A maintenance log should be kept by the inspector with a description of all jobs, when they were done, by whom and the cost. Photos should be taken to record significant jobs.

Specifications prepared for any work should be kept with the log, as they will form the basis of all like work in the future. For example, paint touch up can be carried out with reference to the full repainting specification.

9.6 PROGRAMME

An outline maintenance programme for the building is set out below. It does not include general housekeeping jobs—vacuuming, washing and cleaning—that should be carried out on a daily, weekly or monthly roster as appropriate. Note that this is a programme made independent of a decision of a new use. It must be revised when upgrading and new use work has been completed.

ELEMENT	TASK	FREQUENCY
Roof	Check for loose, broken or missing slates	6 months
	Check lead flashings	6 months
	Check Nuralite roofing for tears, lifting of edges, etc	6 months
Rainwater disposal	Check and clear all external gutters	1 month
	Check and clear rainwater heads and downpipes	1 month
	Check downpipe fixings	6 months
	Check and clear gully traps and open channels	1 month
	Rod stormwater drains	5 years
Exterior walls	Check for graffiti	
	Check for cracks, peeling paintwork, loose plaster, etc to wall surfaces	6 months
	Check for growth of moss, mould or weeds	6 months
	Monitor any previously identified cracks	2 years
	Allow to wash exterior surfaces	2 years
	Allow to clean and paint	5 years
Exterior doors and windows	Check swings, oil hinges	6 months
	Check locks and catches	6 months
	Check condition of timber and coating	6 months
	Check for broken or cracked glass	6 months
	Allow to clean and paint	5 years
Roof space in turret	Check for roof leaks	1 year
	Check for decay and borer in timbers	5 years
	Allow to treat for borer	20 years

ELEMENT	TASK	FREQUENCY
Internal spaces	Check wall surfaces for flaking, blistering, etc of finishes	1 year
	Check wall surfaces for efflorescence	1 year
	Allow to redecorate	10 years
Internal doors	Check swings, oil hinges	1 year
	Check locks and holding mechanisms	1 year
	Check coatings	1 year
	Allow to redecorate	10 years
Floors	Check condition of all flooring materials	1 year
	Check for lifting edges, etc that might be a safety problem, also stair nosings	1 year
	Allow to replace floor coverings	20 years
Sanitary plumbing	Check operation of flushing mechanisms	6 months
	Check that overflows are not running	6 months
	Check taps for leaks	6 months
	Check all visible pipework for leaks	6 months
	Check plugs, soap and towel dispensers, etc	6 months
Electrical	Check all bulbs and fittings and replace as necessary	1 month
	Check switches and light fittings, interior and exterior	6 months
	Check whole of electrical installation	5 years
Cabling	Carry out checks of telephone and communications cabling	1 year
Fire	Check egress ways are clear	1 month
	Check for and remove any unnecessary fire loading material such as paper rubbish	1 month
	Check and test all fire fighting equipment including extinguishers and fire hose reels	6 months
	Arrange for fire drills to be carried out	1 year
	Enforce no-smoking policy within the building	
Lightning	Check lightning conductor for continuity and earth resistance	1 year
	Check connections to building	1 year
Earthquake	Check for damage to roof, exterior walls and structural elements	Following an earthquake
Storm	Following a major storm, check for damage to roof, exterior doors and windows	
Setting	Mow surrounding lawns	1 month
	Clear grass and weeds from around channel drains, sumps and ventilators	1 month
	Allow to wash/mould kill on paved surfaces around the building	1 year
Warrant of Fitness	Carry out checks required for the Building Warrant of Fitness, and supply warrant of fitness to the Wellington City Council as prescribed by the Building Act 1991. These checks to be carried out by an Independently Qualified Person	1 year

10. References

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Appendix 1

BUILDING PLANS