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New International Selection Full Documentation Fiche 2003

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composed by national/regional working party of: **Australia**

International working party for
documentation and conservation
of buildings, sites and neighbourhoods of the
modern movement

0. Picture of building/ group of buildings/ urban scheme/ landscape/ garden
1.



depicted item: Becker House, the Academy of Science
source: Noni Boyd March 2003



depicted item: Construction of Becker House, the Academy of Science
source: <http://www.science.org.au/dome/story.htm>

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1. Identity of building/ group of buildings/ group of buildings/ landscape/ garden

1.1 Data for identification

current name: BECKER HOUSE

former/original/variant name: AUSTRALIAN ACADEMEY OF SCIENCE

THE DOME

number(s) and name(s) of street(s):
town: Canberra

province/state: ACT
post code: 2064

block: lot:
country: Australia

national topographical grid reference:

current typology: Conference and Research facility

former/original/variant typology: Conference and Research facility

comments on typology:

1.2 Status of protection

protected by: state/province/town/record only

Register of the National Estate

ACT Heritage Register

RAIA National Register

grade: not applicable

date:

valid for: whole area/parts of area/building whole of building

remarks:

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1.3 Visually or functionally related building(s)/site(s)

name(s) of surrounding area/building(s): Civic Precinct
Australian National University

visual relations:

functional relations:

Becker House is located on the western edge of the Civic Precinct of Canberra City, and adjacent to the Australian National University and Screensound Australia (formerly the Institute of Anatomy)

other relations:

2. History of building(s) etc.

2.1 Chronology

Note if the dates are exactly known (e) or approximately estimated = circa (c) or (±)

commission or competition date: 1956 (competition)
design period(s): 1956 - 1957
start of site work: January 1958
completion/inauguration: April 1959

2.2 Summary of development

commission brief: Limited design competition, 1956
Firms invited to submit, 6 entries received.
design brief: Developed by the Australian Academy of Science
building/construction: Re-inforced concrete dome
completed situation:
original situation or character of site: Situated adjacent to the Australian National University

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2.3 Relevant persons/organisations

| | |
|-------------------------------|--|
| original owner(s)/patron(s): | Australian Academy of Science Building Design Committee |
| architect(s): | Grounds, Romberg & Boyd Design Architect: Roy Grounds |
| landscape/garden designer(s): | Professor L.D Pryor, Superintendent of Parks & Gardens |
| other designer(s): | Furnishings; Bettine Grounds (Mrs Roy Grounds) |
| consulting engineer(s): | The Department of Engineering, University of Melbourne. Professor A J Francis, Electrical & Mechanical; W.E Bassett and Associates, Melbourne, Acoustics; Bolt, Beranek & Newman Inc. Boston, USA |
| building contractor(s): | Civil & Civic Contactors p/l Australia |

2.4 Other persons or events associated with the building(s)/site

name(s):
association: members of the Australian Academy of Science
event(s):
period:

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2.5 Summary of important changes after completion

type of change: alteration/renovation/restoration/extension/other:

date(s):

circumstances/ reasons for change

effects of changes:

persons/organisations involved:

3. Description of building(s) etc.

3.1 Site/building character

The following description is drawn from the Australian Register of the National Estate listing for Becker House.

The features intrinsic to the significance of this place are the Australian Academy of Science building, Becker House, and the moat surrounding Becker House.

Becker House consists of a flattened concrete shell which tapers off to sixteen points, creating a parabolic arch between each load point. This serves to disperse the outward thrust of the dome evenly, whilst creating penetrations in the dome and reducing the heavy aesthetic that a concrete dome creates. The structural components of the building act as a continuous entity, making the dome extremely stable, preventing movement and the need for expansion joints.

The perimeter beneath the dome is enclosed by an aluminium framed curtain wall. The planning of the internal areas is based on a radial grid and is essentially symmetrical. There are two floors with a central void known as the Wark Theatre. The theatre seats 156 people. The building also provides facilities for smaller conferences and meetings in the Council Room and Jaeger Room. The internal walls are mainly brick with simple reinforced concrete slabs creating the second floor. There are concrete beams supporting the second floor slab across the larger open areas.

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The design of Becker House paid particular attention to the sound environment, both in terms of acoustic privacy and the clarity of natural sound. The use of carpet, timber panelled walls and vermiculate ceilings, as well as extensive soft furnishings in most areas, provides a quiet atmosphere and limits unwanted sound transmission both within rooms and to adjacent rooms. High quality natural acoustics of the Wark Theatre was designed for speech clarity. The interior walls and the ceilings and integrated lighting provide the means of tuning the room acoustics. The asymmetric arrangement of suspended ceiling discs which act as sound reflectors and provide the main illumination of the space.

The dome is reinforced concrete graduating from a thickness of approximately 60cm at the base supports to approximately 10cm at the peak. The top half of the dome was formed in a single concrete pour. The external cladding of the dome is an overlap, interlocking copper sheeting. The outward thrust of the dome is dispersed by the moat which acts as a ring beam acting hoop tension. The moat's second function is to diffuse and reflect the harsh Canberra sunlight under the arched overhang and into the building.

Beneath the ground of each of the sixteen load points is a concrete beam on piers taking the footings down to a solid rock foundation. The moat, beam, piers and footings are basically a continuous entity, making the dome extremely stable, preventing movement and the need for expansion joints. The dome is fully self-supporting and expresses the glass curtain wall, simply as a skin enclosing space. The building has been described as being of unconventional, futuristic design.

The construction of the dome was preceded by the building of a one-fortieth scale model constructed from fibre-glass cloth impregnated with a polyester resin. Strain measurements were taken from the model to predict the initial deflection of the concrete shell. The testing proved effective when the actual dome was constructed as it only deflected 3/8 inch in the centre.

At 45.75 metres in diameter, the Academy's dome is larger than any other dome built before the twentieth century. Its diameter exceeds that of the largest known pre-twentieth century dome, the concrete dome of the Pantheon in Rome which has a diameter of 43.0 metres. In diameter, it was also larger than the largest dome previously built in Australia, which was the 31.5 metre reinforced concrete dome of the Reading Room of the State Library of Victoria .

The architect Roy Grounds, designed the building to suit the locality. He also stated that 'the domed shape was a corollary of the rounded hills and mountains that enclose the valley of Canberra'. The building is located on the eastern slopes of the Acton Ridge, in a precinct that forms an interface between Canberra City including the hotel and business buildings east of Marcus Clarke Street, and the Australian National University. The precinct was developed by the Federal Capital Commission with the Institute of Anatomy on the ridge crest and on the lower slopes, hostels and guest houses for use by public servants. The Australian Academy of Science was conceived as an independent national academy and sited between the classically styled buildings of the Institute of Anatomy, Hotel Acton and Beauchamp House. It's low-rise dome-form creates a unique central feature between the earlier classically styled buildings. The open space areas between the Academy and its neighbours enable the iconographic architecture of the dome with its moat and parabolic arches, to be fully visually expressed. The dome building is a most effective structural solution, that creates and encloses a unit of space as well as emulating natural forms. It is therefore aesthetically comforting and physically stimulating at the same time.

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3.2 Current use

of whole building/site: Conference, research and office facilities.

of principal components (*if applicable*):

comments:

3.3 Present (physical) condition

of whole building/site: The building is in fair to good condition.

of principal components (*if applicable*):

of other elements (*if applicable*):

of surrounding area (*if applicable*):

comments:

3.4 Note(s) on context, indicating potential developments

Indicate, if known, potential developments relevant for the conservation/threats of the building/site

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4. Evaluation

Intrinsic value

4.1 technical evaluation:

The concrete dome of Becker House was a significant technical and design achievement for its time, and received national and international recognition.

The dome of Becker house is not a fully rounded form, but flattened, or shallow – a segment of a sphere. It is a self-supporting form and none of the internal walls or perimeter glazed wall structurally touch the dome. The dome shell varies in thickness from 75mm at the top to nearly 600mm at the base. The reinforced concrete dome is 46.3 metres in diameter. At its time it was a large reinforced concrete dome structures by world standards and the largest dome structure in Australia.

4.2. social evaluation:

Becker House has become a landmark building and a significant tourist attraction in Canberra. On completion, it was one of the principal building icons of a modern Canberra. (*Australian Heritage Commission 1998*)

The building remains a prominent venue for the national and international activities of the Australian Academy of Science

The building is associated with numerous significant scientific, political and cultural figures who have been involved in either the Academy, the design and construction of the building, or in its operation over 40 years. These include:

- M. L. Oliphant
- D. F. Martyn
- Clunlies Ross
- J.C. Eccles
- D. Mawson and ACD Rivett
- Founding members of the Academy.

The name Becker House and a number of the rooms within the building are now named after significant

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4.3. cultural and aesthetic evaluation:

The building was the first and only building constructed by the Australian Academy of Science and has a direct association with a number of prominent national and international figures in the scientific, political and cultural sectors.

The building has been successfully integrated into its surrounding landforms and roadways.

The building demonstrates a clarity of design philosophy in the uncompromising, integrated and consistent architectural style and detailing of the buildings exterior and interior. (GHD 1999)

The building has a high level of design integrity, with few alterations having been made to the building fabric

Becker House was awarded the Royal Australian Institute of Architects RAlA (NSW Chapter) 1959 J.S Sulman Medal for Architectural design excellence (*Australian Heritage Commission 1999*)

Becker House is the only dome formed public building in Canberra. It is also one of the few buildings in Canberra to utilise interlocking flat copper roof sheeting

The original furnishings of the building (most of which remain), were designed for the building

Comparative significance

4.4 canonical status (local, national, international)

Becker House is a rare example of the use of a free standing dome form for a 20th century building and is one of the largest reinforced concrete, dome formed buildings in Australia and the world.

The structure of the building was a significant design achievement for its time. The dome form was a structural solution to a functional problem of creating a shape that created a pleasant atmosphere for an auditorium (*Australian Heritage Commission C 1998*)

Becker House is located within a precinct of buildings which house significant national collections or research establishments. The building has association with the research faculties of the adjacent Australian National University and is adjacent to Screen Sound Australia (formerly the Institute of Anatomy).

The building is exemplary of the Australian Academy of Sciences' goal to project a public image of a progressive organisation. It is also representative of the pattern developed in Canberra to house national Institutions in purpose-designed buildings of landmark quality.

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4.5 historic and reference values:

Becker House was designed by Sir Roy Grounds, one of the most significant Mid 20th century Australian Architects. It was his first major public commission. The building demonstrates many of the design principles which embody the work of Grounds. (*GHD 1998*)

The project was designed in the office of Grounds, Romberg and Boyd, arguably as individuals, the three most influential mid 20th Century Melbourne Architects

5. Documentation

5.1 archives/written records/correspondence etc. (state location/ address):

Register of the National Estate Listing, Australian Heritage Commission.

The Conservation Management Plan listed below should indicate archival sources.

5.2 principal publications (in chronological order):

Gutteridge Haskins and Davey; *"The Australian Academy of Science Conservation Management Plan"*- Volume 1 and 2, June 1999

The Australian Academy of Science: The first twenty five years" Australian Academy of Science, Canberra, 1980

Frank Fenner ed; *"The Australian Academy of Science: the first forty years"*. Australian Academy of Science, Canberra, 1995

5.3 visual material (state location/ address)

original visual records/drawings/photographs/others:

unknown (refer to the Conservation Plan)

recent photographs and survey drawings:

refer to the Conservation Plan.

film/video/other sources:

Australia Academy of Science web site; <http://www.science.org.au>

5.4 list documents included in supplementary dossier

****NOT YET COMPLETED****

6. Fiche report

name of reporter: Noni Boyd based on information from Eric Martin

address: GPO Box 1334, Sydney, NSW 2001

telephone: fax: e-mail: noni_jd@hotmail.com
date of report: June 2003

examination by DOCOMOMO national/regional section

approval by wp co-ordinator/registers correspondent (name):

sign and date:

examination by DOCOMOMO ISC/R

name of ISC member in charge of the evaluation:

comment(s):

sign and date:

ISC/R approval:

date:

wp/ref. no.:

NAI ref. no.:

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