

NORTH SYDNEY OLYMPIC POOL

AIRHOUSE

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AC702

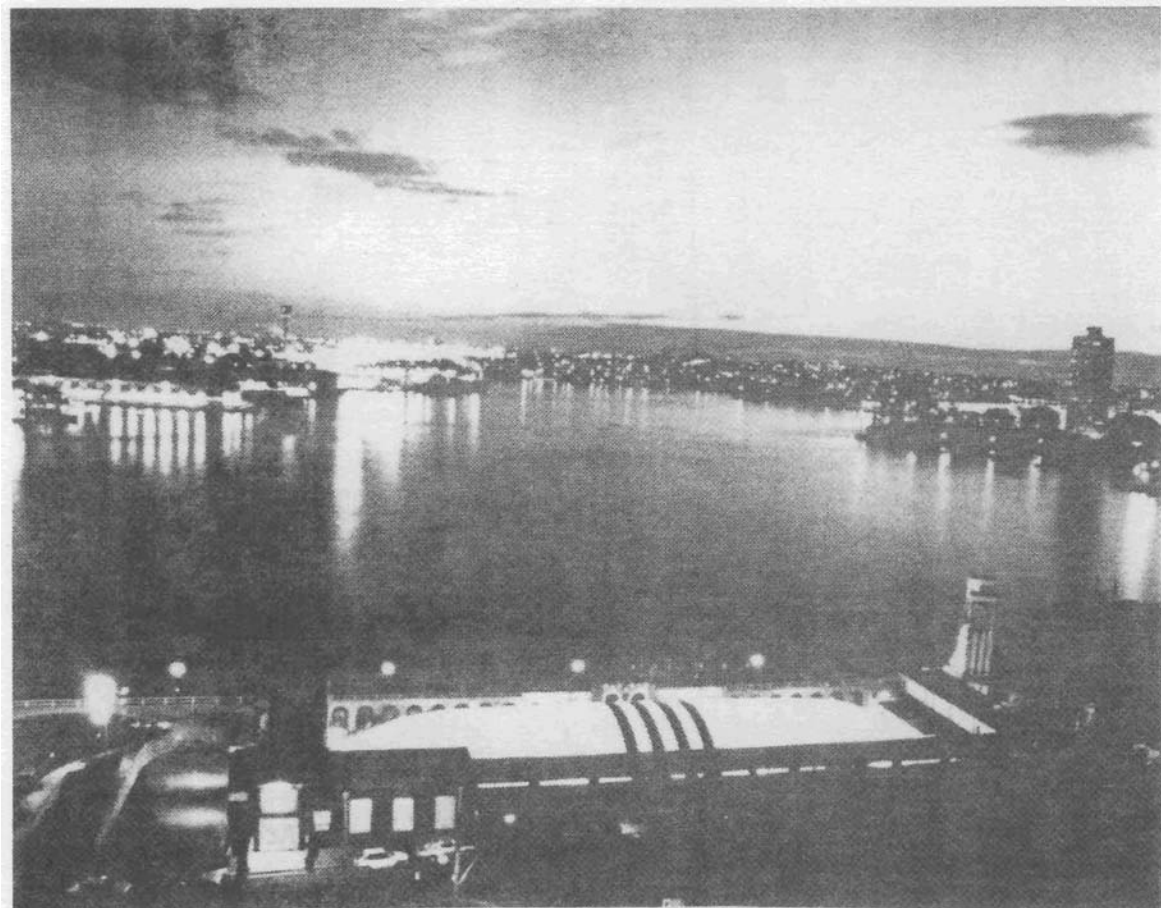
SYNOPSIS:

This paper describes the history, financial considerations, technical aspects and users experience for a removeable air supported structure over an existing 50 metre Olympic Pool at North Sydney.

The pool was originally covered with an airhouse in 1981 and achieved immediate success both financially and with public acceptance.

A new, **improved** cover was erected in 1987 as the first stage of a comprehensive **re-development** of the whole pool complex.

The experience at North Sydney has proven the viability of airhouses to provide cost effective enhancement of existing Municipal pools into **summer** and winter operations.



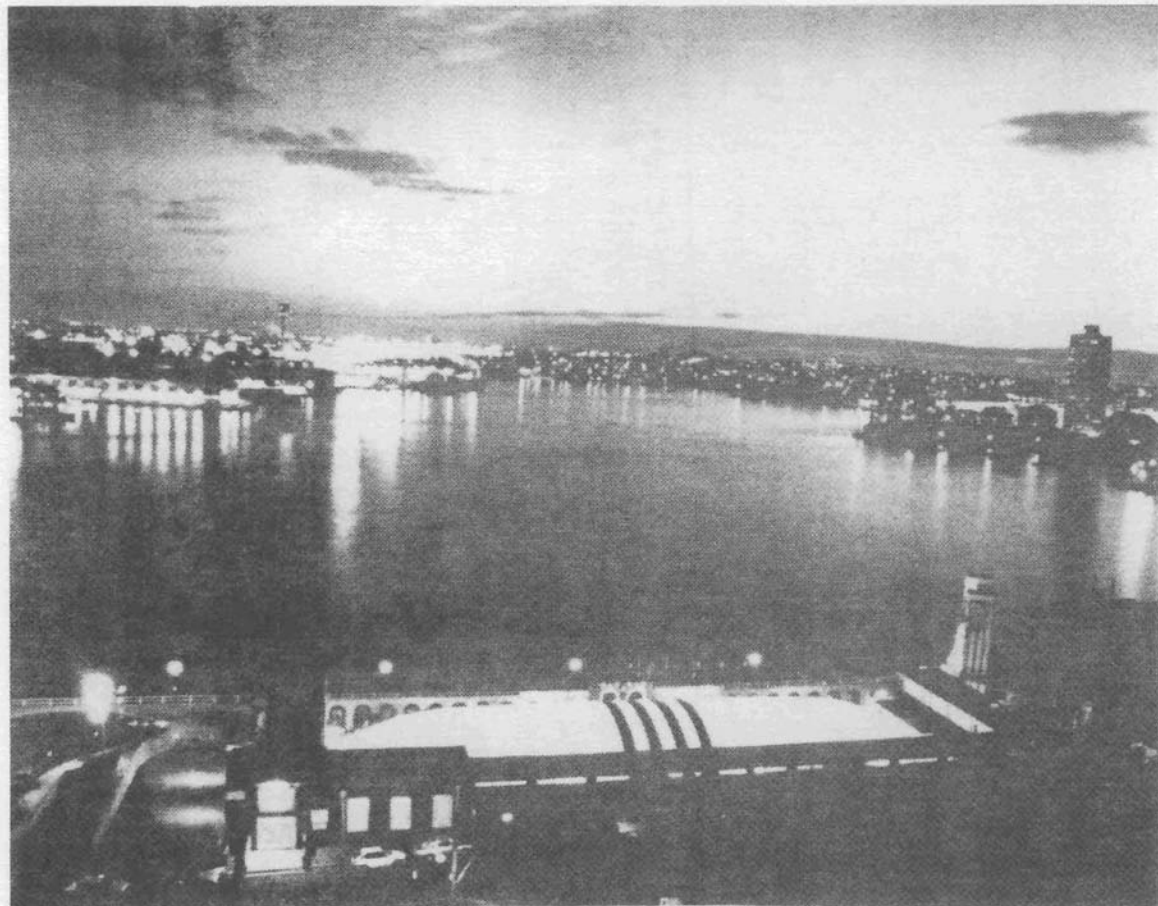
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HISTORY:

The history of the North Sydney Olympic Pool **airhouse** started in **1979/80**. Prior to this time the New South Wales Department of Sport and Recreation had identified the need for expanded swimming recreation needs within the **community**. As a solution, the development of indoor 25 metre pools was investigated. Although the Department provided funding to partly offset the costs to Councils, the 25 metre indoor pools proved too costly.

This was in fact the case with the North Sydney Olympic Pool. Mr Charles Elliot, the Manager, had received quotes of \$600,000 for a 25 metre indoor pool at North Sydney. As the Department of Sport and Recreation grant was only \$75,000, the Council was not in a position to proceed. The Architect for the indoor pool, Mr Stuart Aldrit of Khan Finch and Partners, suggested the investigation of lightweight fabric structures to cover the existing pool.

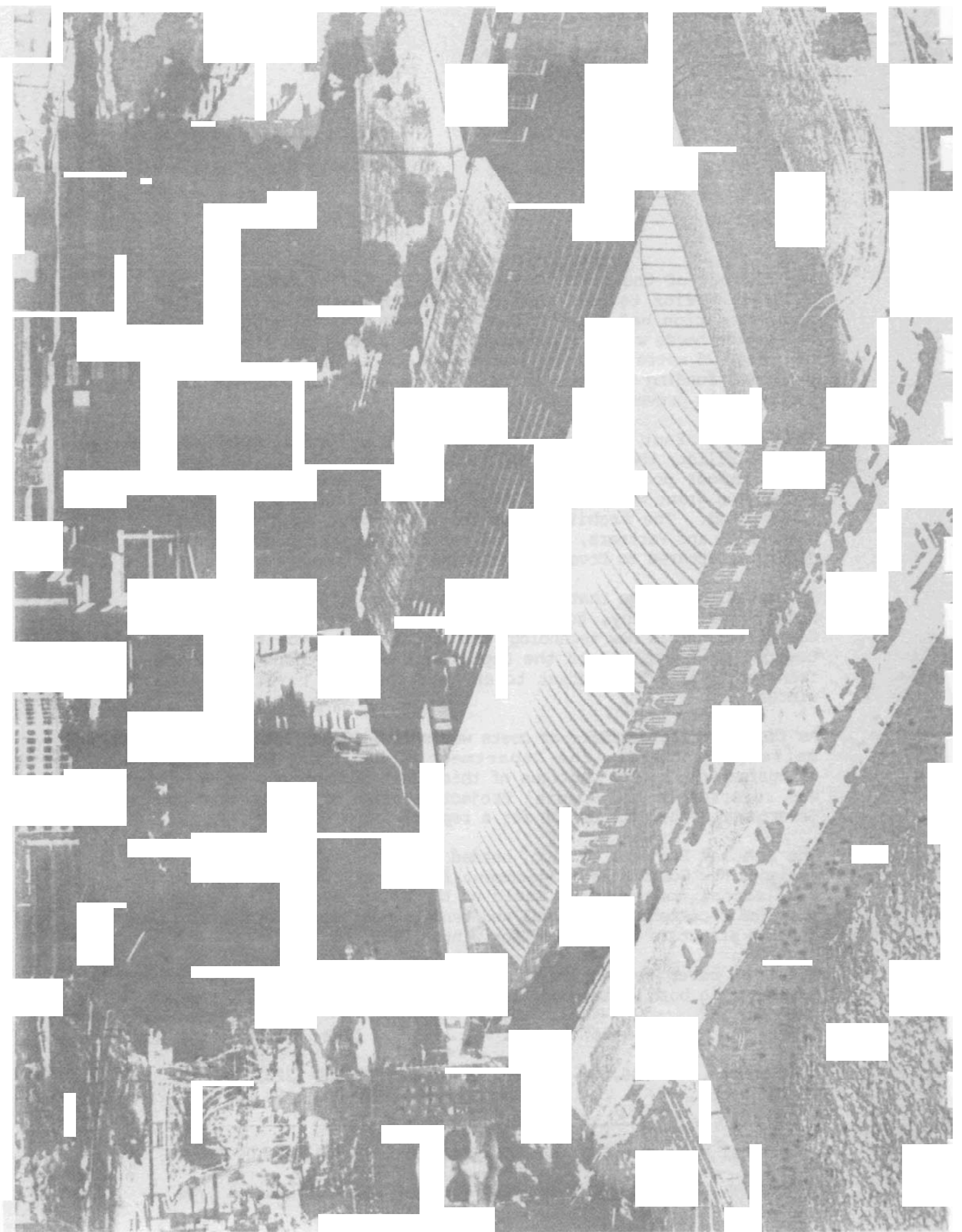
It was at this stage that Mr **Les** Thoroughgood of the 'Environmental Structures' company, together with Charles Elliot, convinced the Council that this new technology was applicable to their needs. The Council then applied to the Department of Sport and Recreation to transfer their \$75,000 grant to an '**airhouse**' to cover the pool in winter.

As the projected estimate of costs was some \$400,000 less than the 25 metre indoor pool, the Department of Sport and Recreation was enthusiastic but also cautious of this 'new' technology. The proposal was referred to the Special Projects section of the New South Wales **Government** Architects branch for a report.

The Special Projects section, headed by Mr Andrew Andersons (recently resigned New South Wales Government Architect) was not cast in the traditional conservative mould of the Public Service. A report was prepared **recommending** approval and tenders were called in early 1980 and the structure was erected for winter 1981.

The pool cover was an immediate success with greatly increased patronage in both winter and, interestingly, summer as well.

	1956	1961	1981	1982	1983
Summer	246,000	120,000	176,000	209,000	220,000
Winter			72,900	73,500	91,000
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Total	246,000	120,000	248,900	282,500	311,000
	=====	=====	=====	=====	=====



The original proposal by
ENVIRONMENTAL STRUCTURES

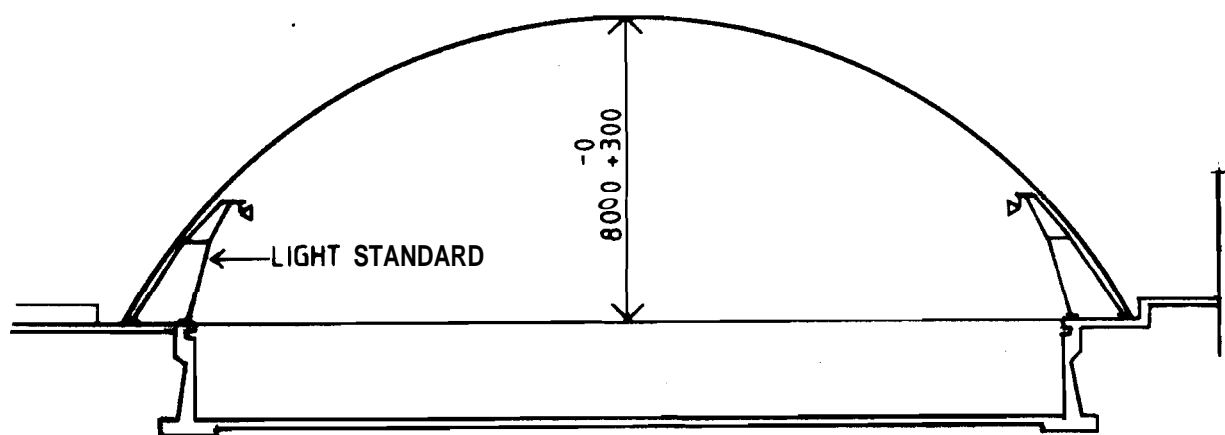
FINANCIAL CONSIDERATIONS:-

The installation of the **airhouse** reduced the Council's operational cost by \$90,000 in its first year of operation, as the Department of Sport and Recreation subsidy provided \$75,000, the Council's additional outlay of \$100,000 was almost covered in its first year. Since that time, the Council has achieved an operating surplus averaging \$30,000 per annum for the last four years.

Everyone in Local Government is aware that local Municipal pools are a drain on Councils income, quite often to the amount of \$100,000 per annum and more. The North Sydney experience should be the fore runner of similar projects throughout Australia.

Average Winter Daily Air Entrances:

Winter 1981	-	586 people per day
1982	-	610
1983	-	719
1984	-	786
1985	-	890
1986	-	956
1987	-	1,050
1988	-	1,050



TYPICAL CROSS SECTION

FIRST AIRHOUSE 1981 - 1987:

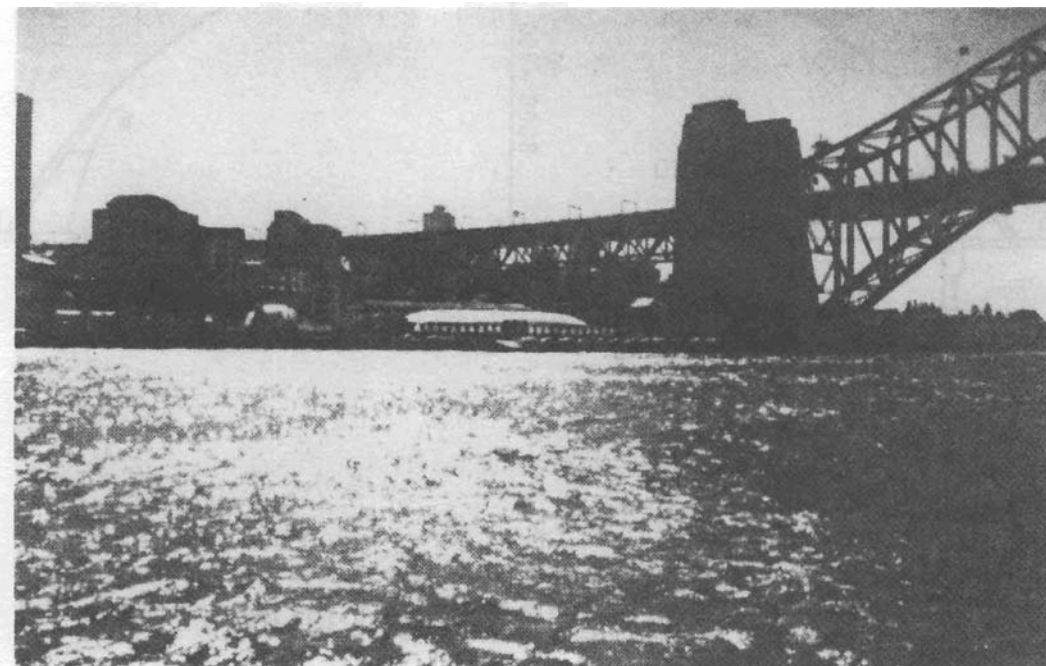
Size of structure: 66.0 x 26.5 x 8.0 high.
Contractor: O.R. Duchon Pty. Limited.
Tender price: \$196,600.
Contract period: 16 weeks.
Country or origi Italy.

Fabric:-

Manufacturer and Country: Hoechst, Germany.
Catalogue no, colour: 6601/880 (white).
Base fabric and thickness: Polyester 0.93.
Fabric weight: 360gm/m2.
Coating type: PVC.
Coated weight: 1,050gm/m2.
Tensile strength kg/5cm-
 (i) Warp: 600.
 (ii) Weft: 550.
Elongation at break:-
 (i) Warp: 15%.
 (ii) Weft: 20%.
Tearing resistance: 100 - 100.
Joints: Welded seams.
Light transmission: 5 - 10%.

The first **airhouse** was a practical utilitarian structure with no special features or embellishments due to the constrained financial **positon** of the Council. The design brief was no more than:

'provide an enclosure for winter **swimming** that can be easily removed for summer use of the **pool**'.



PRACTICAL EXPERIENCE:

During the years 1981 to 1987 Mr Charles Elliot, the Pool Manager, was able to assess the advantages and disadvantages of the first structure with a view to incorporating improvement in a future replacement cover.

1. Number of Sections:-

The airhouse being in one section caused difficulties in handling requiring excessive manpower for pulling the cover into place.

2. Material of Fixtures:-

The fixtures used, such as door frames, braces and light poles were heavily 'double-dip' galvanised inside and out. However, due to the handling damage at erection and demounting, this was not sufficient to prevent corrosion and damage to the paint finish.

3. Airlocks:-

The existing two door system of airlocking was inconvenient to users and the provision of a revolving airlock was considered superior in operation.



4. Free Standing Light Poles:-

Were incorporated with the dual function of supporting cables across the pool. This was done to prevent the fabric covering the water in case of deflation. Practical observation and experience showed that this provision was not necessary for safe evacuation of the structure in an emergency.

5. Mechanical Plant:-

The use of a recycling system for heated air was causing corrosion within the mechanical plant. Any future system would be only stainless steel and not an air recycling system.

6. The Fabric:-

After the second year of operation, discolouration of the fabric started to occur. The fabric was carefully studied by scientists from the CSIRO but the cause of the staining could not be isolated. It was suggested that it could be iron dust from the railway on the Sydney Harbour Bridge. Any future cover would have to be 'slick surfaced' to shed dirt and subject to rigorous maintenance procedures.



NORTH SYDNEY OLYMPIC POOL - REDEVELOPMENT:

In late 1985, North Sydney Council commissioned Architects to prepare redevelopment plans for the pool. An essential component of the redevelopment was an enhanced air supported cover for the 50 metre pool. In mid 1986 Davenport Campbell were **commissioned** as Architects to initiate the replacement cover.

The design brief and performance specification was prepared in close consultation with Mr Charles Elliot to incorporate the design changes he had identified during practical use of the first cover.

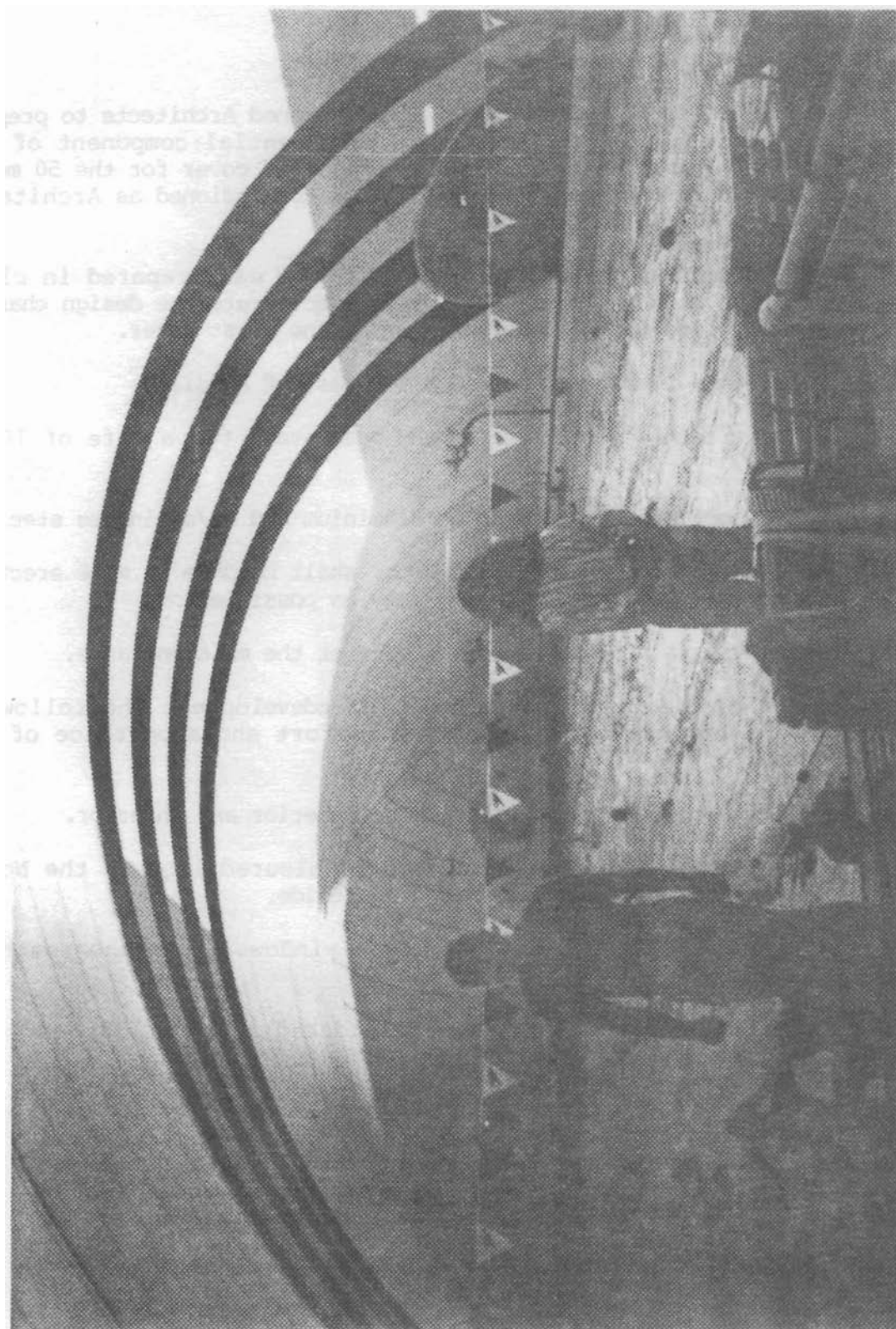
1. Air house to be in 3 sections for ease of handling.
2. Fabric to be "slick" coated and guaranteed for a life of 10-15 years.
3. All doors and fitments to be aluminium and **or/stainless** steel.
4. The design fo all fixings etc. shall **be** done to make erection and **dismounting** as simple and easy as possible.
5. Revolving air lock door to be used at the main entrance.

As the new cover was to form part of the redevelopment the following items were included to enhance the comfort and appearance of the structure.

1. Colour striping to "dress up" the exterior and interior.
2. Provision of a large 7m diameter coloured logo of the North Sydney coat of **arms fixed** to the outside.
3. Installation of glazed port hole windows along the southern concourse.

The **design/construct** contract was tendered in late 1986 and the structure was in place by winter 1987.

As with the original structure, public acceptance has been overwhelming. The inclusion of colour striping and the **portholes** has added a further dimension of **visual** excitement and a richness to the interior that adds to the comfort of the patrons.



NORTH SYDNEY OLYMPIC POOL - NEW AIRHOUSE

- Size of Enclosure:**
- 8.00m height
 - 66.4m long
 - 26.4m wide
- No. of Sections:** - 3 with clamp plate field joints
- Architect:** - Davenport Campbell
- Contractor:** - VESL Engineering Services Pty Ltd
(MEMBRANE SYSTEMS DIV)
- Contract Sum:** - \$392,292.00
- First Erected:** - Winter 1987
- Special Features:**
- free standing light standard
 - enclosed connection to pool foyer
 - portholes set into southern face
 - colour striping and North Sydney logo as a removable element
- Free Air Supply**
- 2 Fans x 3,000L/sec normal
 - 2 Fans x 3,000L/sec "Boost"
- The 4 fans are in parallel each 3,000L/sec @ 370 pascals
- Internal Pressure**
- 100-150 pascals normal
 - 200-370 pascals high wind
- Stand-by Generator** - 9 KVA will operate 2 fans during failure of power
- Heating** - Gas fired duct heaters
- Membrane** - Seaman Corp DC 137 white
- Base Fabric Type** - Polyester
- Coating Type** - PVC/Acrylic Top finish
- Coated Weight** = 1,000 gm/m²

BRIGHT RED
FABRIC PANELS

CLEARVIEW PANELS SET OUT POINT

NORTH SYDNEY COAT OF ARMS
TO BE REMOVABLE FOR MAINTENANCE
• COLOUR BRIGHT ORANGE



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