05

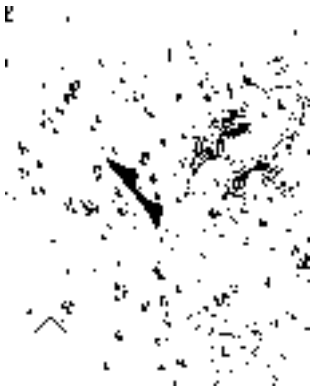
top right
the café/ restaurant pavilion with
radially sawn timber battens

•**Description** - Following the contours of the surrounding dunes, the two main buildings of the centre wrap around a central courtyard. The two parts can be interpreted as representing Liru and Kuniya, two snakes from Anangu mythology, watching each other across the battlefield. The two buildings are joined by curving timber and brush walls creating various outdoor spaces for dances and other cultural gatherings.

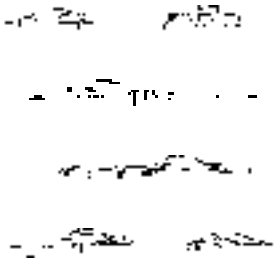
The visitor enters the southern building, which contains displays explaining the traditional laws and arts and crafts of the Anangu peoples, and a display describing the joint management of the park. The northern building contains a multi-purpose hall, shops selling souvenirs and take-away foods, offices, storerooms and plant rooms. To the west of the buildings is an outdoor space for dances, which will eventually be shaded by vines and traditional structures. The northeast opens up to a courtyard that frames spectacular views of Uluru.

In capturing the shifting and dynamic qualities of the western desert, so different to the landscape of most of the visitors, Burgess and his collaborators have created an experience where the visitor is constantly crossing thresholds: from inside to out, light to shade, intimate space to endless vista. There is no prescribed movement path and the visitor is constantly faced with choices and options. Each visit, like the desert, reveals something new. Hopefully this will take the visitor out of the passive tourist mode, and stimulate them to pause, inquire, think and learn, leaving the Anangu people's land with an understanding of their culture and the landscape of Uluru.

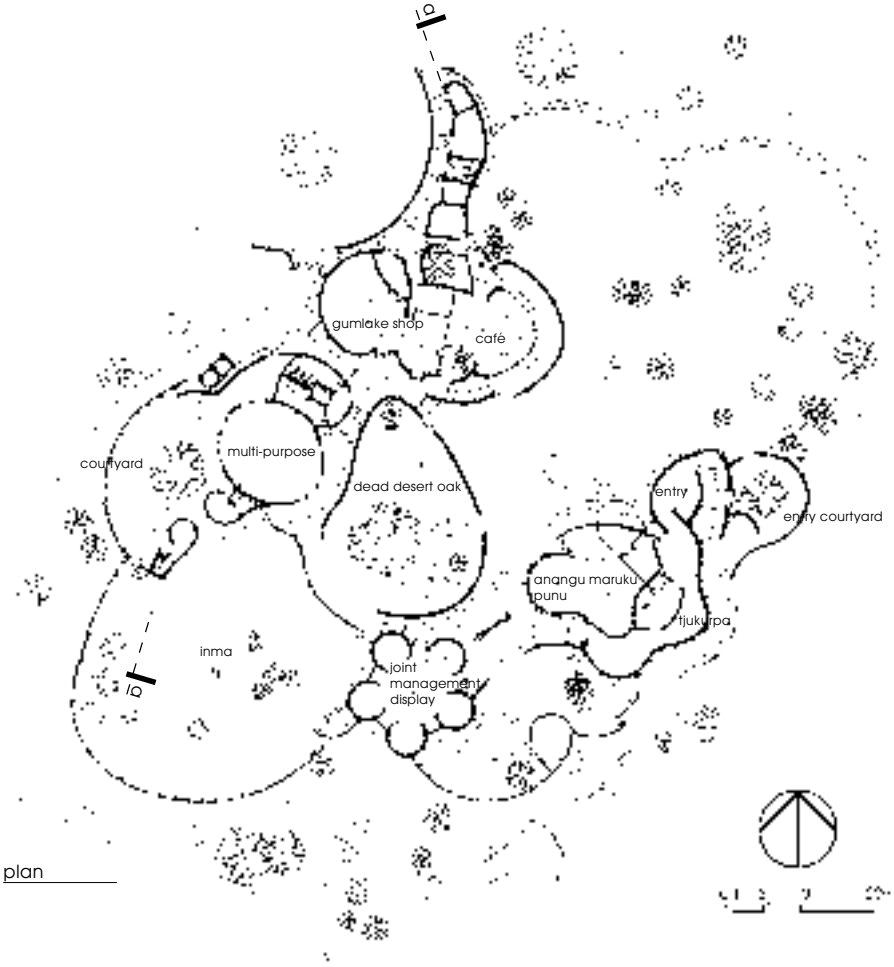
location



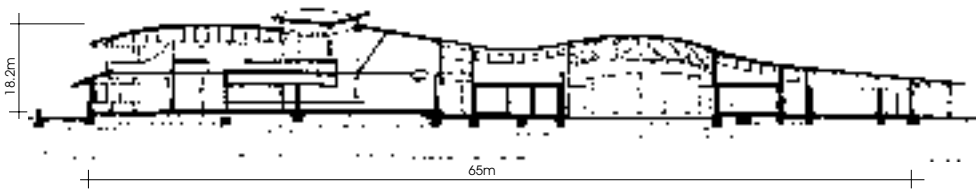
site plan



elevations



plan



section a-a

top right
location of the cultural centre in relation to uluru

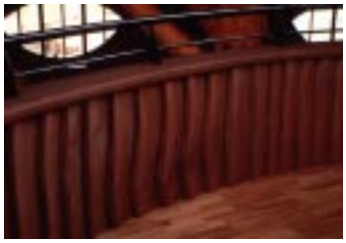
middle right
site plan

bottom right
elevations of the centre

above left
ground floor plan of uluru centre

left
section a-a (along the ridge of the northern building)

•**Structural Description** - A range of natural materials and inventive detailing were used in the construction of the cultural centre. The **adobe** walls that encircle the building act as a thermal flywheel, stabilising the temperature inside the building by absorbing heat during the day and releasing it at night when the temperature drops. These walls are tied to the main structural frame of over 200 round poles. Both the adobe walls and poles sit on foundations of compacted sand stabilised with concrete. Rigid steel frames within the timber structure brace the building.



The main roof structure on both buildings is supported down the centre by an undulating LVL **ridge beam**, which in turn is supported by timber poles. Plywood **gussets** and nails connect the different segments of the ridge beam. For the 14 metre span of the multi-purpose room, the LVL ridge is replaced by a truss made of 200mm diameter natural poles joined by steel connectors concealed within the poles. At the perimeter the roof structure falls either directly on a timber pole or an LVL perimeter beam spanning between the poles. For larger spans a composite rafter is made up of two radial sawn members **nail laminated** together. The rafters spanning from the ridge to the perimeter beam are mostly radial sawn Yellow Stringy Bark with some round pole rafters. The rafters support a roofing system of Bloodwood timber or copper shingles on timber battens and plywood.

top right
openings between roof layers allow ventilation and natural lighting.

middle (left to right)
- detail of restaurant mezzanine floor hand rail showing the radially sawn timber
-the post and LVL beam walls, radially sawn rafters and the LVL ridge beam of the building (while under construction)
- the undulating Bloodwood and copper shingled roof of the south building looking back towards Uluru
-columns in anangu maruku punu (near the entry foyer)

bottom right
interior of joint management display space flooded with light from the ceiling skylight

•**Radial Sawn Timber** - The varying availability of our timber resource makes using the most out of what is harvested an imperative. Greg Burgess likes using timber, which he regards as an environmentally sustainable material, but he wants to get as much resource out of each log as possible. Radial sawing, an old method of milling now adapted to automated operations, involves cutting a log from the outside to the centre to produce wedge shaped segments of timber. This method has two major benefits.

[1] It uses far more of the log than traditional milling methods. With radial sawing 70-80 % of the log is used compared with 30-50% with **backsawing** and **quartersawing**. The Architects estimated three times as many trees would have been needed to produce the roof structure using normal milling methods. [2] With each piece of timber the growth rings are always at right angles to the face of the timber. Since most shrinkage as timber dries is around the growth rings this means there is little distortion when drying.

This second point is very pertinent to the cultural centre. Most of the timber used in the building came from the wet temperate forests of Australia's east coast. As the timber reduced its moisture content to match the dry environment of the central desert, significant shrinkage and distortion would have followed. The dimensional stability of radial sawn timber greatly reduced distortion and shrinkage relative to backsawn.

In the Uluru-Kata Tjuta Aboriginal Cultural Centre radial sawn timbers were used as exterior cladding, timber grills, balustrades and internal linings, as well as for structural members.

Building with the tapered sections of radial sawn timber presents unique problems compared with square sectioned timber, but with careful and considered detailing there are no barriers to its successful use.

•**Detailing of timber connections** - An important process in the design of any building is the detailing of the connections that join the structural members. There is no timber structure that does not make use of connections. In contrast to many other materials, timber offers a wide variety in the type of connections. This provides the architect with great scope for creativity in the detailing of joints. However, in designing a joint it is important that consideration be made of the type and species of timber being connected, the structural load on members, durability and fire resistance, the construction process and available skills of the builders, movement in the structure, cost and aesthetics.

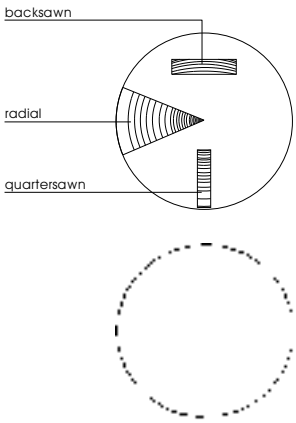
In detailing the Uluru-Kata Tjuta Aboriginal Cultural Centre, the architects and engineers had to take into account its remote location and chose low technology, on site fabricated solutions. For the connection of the radial sawn rafters to the ridge beam, the end of each rafter was back nailed to a plywood gusset, which was then nailed to the LVL ridge beam. Where pole rafters met pole columns, a ledge was cut out of the pole, on which the rafter sat. The connection was then secured with soft wire looped around the head of coach bolts in all the adjacent members. These simple and ingenious solutions were appropriate to the building process, but also fitted in with the natural, approachable quality of the centre and the low-technology, improvised building tradition of central Australia.

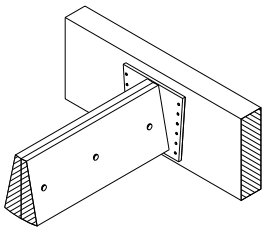
left
tied joints - simple technology allowing for movement in the structure

middle left
the natural variation of raw untreated timber poles

right
the tapered section of each milled piece of timber from a radially sawn log

below (top to bottom)
-diagram showing types of cut
-diagram showing shrinkage problems occurring depending on where the log the timber is cut from
-detail of connection between nail laminated radially sawn rafter + ridge beam





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•**glossary**

adobe: roughly moulded and sun-dried blocks made from puddled earth reinforced with chopped straw or other fibrous binders, for use in earth-wall construction

backsawn: timber sawn so that the growth rings are inclined at less than 45 degrees to the wide face

gussets: plates, often steel or plywood, fixed by nails, bolts or other means to connect timber members in a truss or other frame structure. Gusset plates may be applied to one or both sides of a joint

nail laminated timber: a built up product made of layers or laminations of wood, all with the grain laid parallel and nailed together

quartersawn: timber in which the average inclination of the growth rings to the wide face is not less than 45 degrees

ridge beam: a beam located at the highest part of the roof to support the upper ends of the common rafters

•**on the internet**

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http://timber.org.au/education/architecture/

this and other timber projects:
http://oak.arch.utas.edu.au/projects/

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