

# A NEW DESTINATION DOWN UNDER

Best known for its natural beauty, Far North Queensland is rapidly becoming an economic center as well



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**I**F YOU'VE NOT BEEN THERE, YOU MIGHT ASK, WHAT'S IN FAR NORTH QUEENSLAND, AUSTRALIA? Lush tropical rainforests and rising cliffs, ribbons of palm-fringed white sand beaches, miles and miles of the bluest of ocean, and the Great Barrier Reef. Located along the coast in the midst of all this splendor is the City of Cairns, the capital of this vast region populated by well over 200,000 residents. And smack downtown, occupying two city blocks, is the new "center" of the city—Cairns Central, a \$144 million, 500,000-square-foot

mixed-use development that links directly into the main railway station.

Back in 1993, recognizing the need for a strong urban core to support their vision for the future, Cairns city officials targeted an existing railyard located adjacent to the hotel and business districts for redevelopment. Every major retail developer in the Pacific Rim region competed for development rights to what was considered to be the single hottest property in all of Australia. Ultimately, a joint venture team of Coles Myer Properties (Tooronga, Victoria) and Suncorp Development, a Brisbane-based financial power-

house, emerged the winner. All parties involved in the Cairns Central project recognized its potential to both spur further redevelopment in this urban setting and satisfy the need for additional retail and services for all of Far North Queensland.

With its pristine beaches and vast sparkling blue sea, Far North Queensland had long been a destination for tourists who arrived by the hundreds of thousands via car, rail or air to participate in reef and rainforest tours. In recent years, Cairns had become a tour de force—a major Australian city that also served as a gateway into the country. Today, 10 international airlines fly more than a hundred flights a week direct into Cairns new international airport from Tokyo, Malaysia, Auckland, Hong Kong, Jakarta, Singapore, Europe and the U.S. Domestic carriers operate well over 600. Even accounting for current economic conditions within the Pacific Rim region, estimates show Cairns growing to well over four million passenger movements a week, half of which will be international visitors.

## VERNACULAR ARCHITECTURE...MODERN INTERPRETATION

Cairns Central incorporates a two-level retail/leisure/entertainment center a 2,700 space carpark and an integrated railway station that services more than 600,000 people per year. Relocated to the inland side of

the site to allow the retail/entertainment center to link directly to the existing urban core at the intersection of McLeod and Shield Streets and ultimately the waterfront, the new railway station features a 1,290-foot-long platform for the "Sunlander" commuter train and the 14-coach Kuranda Scenic Rail. In plan, Cairns Central is a simple dumb-bell, anchored on the southern end by a two-level flagship Myer (Far North Queensland's first upscale department store) and a Target/supermarket precinct at the northern end. The anchors are linked by two opposing curvilinear malls that spring off a center court while a perpendicular civic axis connects the main entry plaza at the McLeod/Shield Street intersection through center court to the station precinct.

The design of Cairns Central derives inspiration from its ecological and environmental setting. The characteristics of the reef and the rainforest were used to develop the forms and shapes of the roof trusses, skylights, floor patterns and finishes throughout the project. The exterior features simple wall masses of precast concrete softened by plantings as well as elements derivative of Far North Queensland architecture—pitched roof gables, overhangs, screens, louvers and bullnosed verandah awnings. There is a "Queenslander" approach to entry points and corner turrets, that both presents a familiar image to the local population and helps to merge the development into the urban context. Overall, Cairns Central represents a modern interpretation of Far North Queensland architecture, as the design team was certain that a period approach to a development of this size would result in a project vastly overscaled, expensive and superficially themed in appearance. Atypical of many large-scale Australian retail developments, Cairns Central is friendly. Its form is familiar to shoppers; it's light, sunny, airy and yet also a



protected environment.

The intersection of McLeod and Shield Streets marks the geographic center of the project and is the location of the most important and symbolic architectural statement. This entry is comprised of a triple-gabled grand verandah which forms deep shaded porches at the upper and lower retail levels. Double-column structural supports, similar to the columns in the interior, support the upper level dining porch and roofs above. To further relate Cairns Central into its urban context and serve as a symbolic gateway into the CBD area, a feature element marks the corner at Spence and McLeod Streets. Here, rising above the parapet of the Myer Department store mass is a tall cylindrical rotunda topped

by a layered metal conical roof with a deep eave and broad overhang.

#### CYCLONIC WINDS IMPACT DESIGN

Special structural considerations involved in building in a cyclonic zone profoundly affected the design of the project. In addition, the effects of cyclone wind conditions stretched budget constraints by requiring a roof structure which has a wind load some six times higher than that of buildings located in areas where tropical storms and hurricanes are not a factor. This clearly highlights the fact that regardless of the design, roof structure in this region of Australia represents a significant portion of the budget. Budget issues were further com-

plicated by the fact that both the developer and the architects envisioned the roof as being a significant contributor to the overall image of the project. The ultimate goal was a "lacier" more open design than that dictated by wind conditions.

A number of approaches were taken to resolve the aesthetics vs. high roof load challenges. The use of twin members in both column and roof truss member overcame the bulk of a single member system. Triangulated roof trusses (single member on top, double on bottom) evolved to achieve a more effective structural roof truss system while minimizing visual weight.

The mall roof, which exposes large scale trusses and members fabricated in Brisbane and welded in place on site, is made up of a series of raised feature roofs above each mall and entry, stepping down onto a conventional framed 3° sloped deck roof over back-of-house areas. The curvilinear roof design is based on a "torus" (doughnut) shape, curving in plan view as well as in section, and faceted to follow the 558' radius of the torus shape. The mall truss system crisscrosses the roof on a 45° angle, thereby reducing the number of mall columns by half and maximizing site lines across malls. (The goal was to create as close to a column-free environment as possible without jeopardizing structural integrity.) The trusses follow the line of the compound curved ceiling and as such are elliptical in shape. The ends of the curved roof overhang the end support columns, requiring a large truss for support. These trusses are 46'x10' high, use 12"-diameter tubular members and are supported off two 33-foot-long, 24"-deep beams built into each sidewall of the roof.

Bracing the mall feature roofs back down to the lower deck roofs proved to be difficult, especially on the curved roof. All connections, from the mall truss systems through the internal linings, were partially concealed

and used either tubular stubs, steel fin plates or both. In some cases, 8-inch steel fin plates were used, all fully welded.

The center court roof is supported on a complex series of trusses which required full 3D design modeling by the consulting structural engineers. The roof has a 72' diagonal lower ring truss supported on four twin tubular steel columns. Radiating up from the lower ring truss are seven steel mall trusses supporting a 20' upper 3D ring truss. Beyond center court, a series of strong gables continue toward the railway station.

No expense was spared to execute the tropical flavor and light weight design effect within the common areas, however a highly-efficient and economical 28'-wide structural grid was used throughout the malls and specialty shop areas to help balance costs. Nautical images of ships, rigging and masting inspired the light lacy truss configurations within this zone, which are highlighted by circular members and slender twin bottom chords instead of a single heavy bottom chord. Column capitals are detailed as finned fluted connectors that recall both flower forms and Victorian cast iron images.

The dual circumstances of the rainforest and the reef form strong design principles for the interior. Inspired by the reef, the center court/food court precinct is located just inside the front door, and is designed as a single, grand interconnected space with the qualities of openness, volume and daylight found in an ocean environment. The sheer volume and transparency of the area, the performance stage and upper level circular center court walkway all combine to create a symbolic "civic place" that serves as an extension of the city.

The rainforest provided inspiration for the meandering serpentine configuration of the retail Galleria. The curvilinear mall is an outcome of designing with the rainforest as a visual

guide, and a column free environment as a development guideline. These two influences combined to form the unique diagonal structural configuration. The diagonal truss work, combined with the twin column supports and branching bracket elements form not only a highly efficient and cost effective structural system but also a metaphor of tree and canopy imagery. The four triangular skylights in either section of the retail Galleria that fall between truss members recall open spaces between tree canopies and are located to interrelate with the palm trees and plantings within the Galleria space below.

#### VISUALLY OPEN DESIGN

Structurally, the diagonal configuration permits every other column to be omitted, visually opening up the Galleria space and improving site lines to store fronts. Aligning the columns with the upper floor walkway edge on the curved side further enhances the spatial characteristics of this zone. Fully exposing these columns as two-story structural elements with a continuous clerestory skylight at the junction of column and truss highlights the curve throughout the project.

The straight edges of the retail Galleria are column free, with the structural elements aligned with the lease line at the upper level walkway, leaving the balcony edge free and clear of any column obstructions. A sinuous wave form in plan has been applied to the upper level walkway at this location to create pockets—interesting resting places for shoppers—along its path. Columns along the lease line at the upper level are exposed and share the same twin configuration as those on the bowed side. This one story version of the standard column arrangement adds interest and detail to the straight side as well as providing a sense of resolve to the roof structure above.

The knuckle courts that punc-



tuating either end of the retail spine add clarity and definition to the main retail precinct. Volumetrically, these courts are rendered as simple conical forms with the twin column supports being the only exposed structural elements. Daylight is introduced through a small oculus skylight at the pinnacle of the cone, providing both a dramatic and economical source of light.

The extent of roof skylights brought about its own challenges. The center court has a 36-foot diameter cone-shaped skylight on top of the roof, supported only at its base as well as a lower cranked skylight surrounding the base of the roof at its junction to the deck roof. The curved roof has glass walls on virtually all four sides and there are 29 skylights in total for the project, with the four triangular skylights following the roof arc. All skylights feature a frit pattern inspired by leaf and floral forms. The frit pattern casts a shadow across floor surfaces by day and creates a reflective surface for up lighting by night, transforming black glass surfaces into delicately patterned planes. The use of high performance glazing which permits penetration of natural light while also controlling heat loadings and shading co-efficiency results in significant energy savings.



One goal in the design of the mall steelwork was to have no visible bolted joints and as a result, every visible steel connection is a welded joint. Each truss was factory assembled and welded as were the twin tubular steel columns. All components were transported 1,200 miles from Brisbane to Cairns via semi-trailers. The trusses were craned into position and fully welded to the steel columns. The extent of site welding (full strength butt welds) required a longer than usual steelwork erection program.

Cairns Central provided an interesting challenge for the design team. The extreme sensitivity of designing with nature as a guide for the forms, shapes and details found within the project was constantly weighed against the objective concerns of development and budgetary constraints. As completed, Cairns Central represents a responsible, thoughtful and imaginative response to the kind of balance between design and value sought by developers and investors.

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