# Robina Stadium

by Mr W.Chalmers
HOK Sport Architecture

## Introduction

On 27th of May, 2005 the National Rugby League (NRL) announced that the 16th NRL franchise had been awarded to the Gold Coast consortium, known as the Gold Coast Titans, with this new team entering the NRL Premiership competition as of the 2007 season. Central to the successful bid and emergence of this new team was a new 25,000 seat rectangular field stadium to be constructed in the Gold Coast region that would host 'home' matches as of the 2008 season.

In June, 2005 the Gold Coast City Council commissioned HOK Sport Architecture to review several shortlisted sites in the Gold Coast area that they believed could adequately house such a stadium. From this feasibility process a 4.8 hectare site at Robina was selected.

The chosen site(Figure 1) is to the north of the Robina Town Centre and within 500m of the Robina Train Station which is the current southern terminus on the Brisbane–Gold Coast rail line and approximately 8km direct from the coastline. Although the identified site and its adjacent plots of land are free of any built environment it was envisaged that the stadium would act as catalyst for future commercial, retail and entertainment development in the adjacent site areas.


*Figure 1. Aerial shot showing the stadium location at Robina and within the city of the Gold Coast.*

## Design Competition

In September, 2005, the Queensland Government through Project Services held an invited design competition for a 25,000 seat regional stadium to host the new Titans franchise and to be located at the above site.

The key brief requirements of the Design Competition were as follows;

- Limited budget. A construction of budget of $120 million was set.
- Capacity of 25,000 seats minimum.
- Tight Timeframe. It was imperative that the new stadium be open in time for the start of the 2008 season, i.e. March 2008.
- Roof Coverage to at least the West Stand.
- Integration of stadium within immediate environment.

HOK Sport Architecture won the design competition through the following design concepts that fulfilled and exceeded the above design parameters.

**Creation of Atmosphere**

The stadium is designed to achieve maximum spectator atmosphere and experience. This is achieved by two key building components, namely the roof and seating bowl, working in tandem.

The seating bowl is a single wrap around tier to achieve the closest seating configuration as well as the maximum coliseum effect. To promote such an effect it was seen as critical that there was a level of equality with regards to size for each of the four stands and not load the side stands substantially more than the end stands.

*Figure 2. Some of the early seating bowl design options. The image on the right shows the option chosen.*

Given the tight design construction budget we had to achieve great efficiencies in the seating bowl design to allow expenditure to be directed to the incorporation of a substantial four sided roof within the cost plan. We achieved these efficiencies through three design directions for the seating bowl;

- Concentration of highly serviced corporate and membership areas into the Western side of the stadium.
- 3 sides of the stadium accommodate general admission seating in a simple repetitive structural and circulation solution.
- The stadium section is an 'at grade' solution on 3 sides.

A roof was designed for all 4 sides of the stadium to achieve the maximum sense of enclosure as well as providing retention of sound and light and protection from weather.

One of HOK's core beliefs was that the provision of a roof on all sides is critical to the successful atmosphere and acceptance of the stadium. There have been a number of regional stadium developments in Australia over the last few years that have shown the poor results of developing a single sided roofed grandstand or independent sided grandstands.

The roof was designed in a simple repetitive cantilever structure, that could be erected in component stages. The roof structure also provides the external walling enclosure to 3 sides of the stadium. The drip–line coverage of the roof provided is just under 80% of all seats. The precise position of the leading edge of the roof was dependant on the costing parameters for the roof and the design allowed for flexibility for this position. What was critical was the provision of the roof on all 4 sides of the stadium, not necessarily the amount of drip–line coverage.

**Identity**

Gold Coast's position as the premier holiday and entertainment and Australia's fastest growing city make it a unique destination and one that is constantly developing. The development of the city is dominated by the high rise skyline of Broadbeach and Surfers Paradise with its absolute beach frontage looking over the Pacific Ocean.

The sun, surf and sand combined with the clean fresh air of the Pacific and the relaxed outdoor lifestyle define the Gold Coast. The Gold Coast can boast an average of 245 days of fine weather each year and daytime temperatures above 22 degrees for 279 days a year.

The notion of developing an architectural character for the region to reflect this lifestyle is one that is still evolving. A defined language for residential towers has long been established. The architectural character of Broadbeach and Surfers Paradise with their concrete and glass facades punctuated and animated with balconies to make the most of the views and outdoor lifestyle has defined high rise residential developments for the last two decades. But what character defines the hinterland and the heart of the city away from the bustling seafront strip? This has generally been an eclectic mix of architecture that has failed to define a city centre or create a sense of urban density.

The Robina Stadium and the associated development opportunities provide the chance to create a urban centre for the Gold Coast away from the beach, a place that can be use by all aspects of the community 365 days a year.

The issue in developing an architectural response that reflects the character of the Gold Coast was core to our design approach. The notion of developing a light open stadium covered by awnings and shade structures creates a compact yet enclosed form befitting of the outdoor lifestyle of the Gold Coast.

The stadium has been designed with a purity of form and attention to detail that will give the building a grace and power befitting of the emerging Gold Coast sophistication. This building is not only about portraying obvious structural gymnastics, but instead presents a form that is relevant to this location. The building identity aims to achieve the following presentation;

- A building that expresses the dynamic movement of sport
- A building that expresses a festival atmosphere
- A building that responds to the gold Coast climate and outdoor living
- A building that captures the strong quality of sunlight.
- A building that expresses it's different functional parts.

There are however references to the more iconic Gold Coast images of surf, sun and the beach. We must not forget that this building must present itself to the Australian television audience and show its identity as unique to the Gold Coast image.

## Roof Architecture

The design of the roof is key to the success of the stadium's design in that it is the centrepiece of fulfilling these two core design concepts of creating atmosphere and identity.

The realisation of creating such an identity is achieved primarily through the roof architecture of curved roof rafters and a PTFE fabric roof covering. The curved section shape of the roof is an effort to contrast with the horizontal forms of the surrounding buildings and also provides a wonderful sense of space in the seating areas and provides a metaphor of the movement of ocean waves and sports endeavours.

The fabric on the roof has been used in a very planar way and we have avoided the obvious tented structures to reinforce the purity of form. The roof will be lit at night to enhance the glow effect that will come from the sports lighting and make this a beacon in the evening.


*Figure 3. Presentation image showing the stadium at night.*

But apart from all these symbolic meanings and architectural nice–ities the roof has a significant amount of practical gravitas to it. From a build–ability, operational, spectator comfort and cost viewpoint the roof architecture has significant benefits.

Construction wise the roof rafters are composed of three box rafter sections that allow for fabrication off site which provides for a higher level of quality assurance and accuracy. This method reflects the preferred approach of the construction of the stadium as a whole – i.e. where possible off–site fabrication and then installed sequentially on–site. Furthermore, the design of the roof frame aligns and interfaces with steel frame of the seating bowl that allows for a simple, elegant and importantly time and cost effective design solution.

*Figure 4. Images showing the sequential construction of the North stand.*

At an operational level the roof profile is of sufficient height such the underslung catwalk can house the sports lighting for the field of play that then negates the need for light towers and their associated cost and light spill and glare impacts. Further to this the PA and other audio related services can be installed on such a platform. The PTFE fabric also has an operational benefit through its self–cleaning and low maintenance qualities.

The intensity of the sun also means that the provision of a roof over as many spectators as possible is a very desirable feature. The provision of shade is most important for spectators and is a balance with the amount of shade on the pitch for grass growth.

Furthermore, the wind conditions of the Gold Coast allow air movement and ventilation to alleviate the ever–present humidity of the South–East Queensland region. As such the upper levels of the façade on the South and East sides of the stadium encourage air flow by the provision of slots in the lap of the roof fabric that along with the vomitories opening provide for air movement and hence cooling to occur across the spectator stands as well as the pitch.

Where the stadium touches the plaza, shade overhangs, referred to in the project as the 'skirt roofs' are provided by the skirt roof to give both a human scale as well protection from the elements.

**Urban Design Response – The Integrated Stadium**

This is not a stadium in a 'greenfield' site in the true definition. The design is responding to its urban village location in what will be a built up surrounds of 8 stories massed commercial /retail buildings. As such, the stadium and external concourse are designed with this in mind – that is the stadium is an intrinsic part an overall entertainment and commercial and even residential precinct – that is, it is an integrated stadium.

Visually, the stadium is in scale compatible with the intended scale of its neighbouring development but provides a counterpoint to the architecture and massing of the surrounding building by its lightweight and curved forms. The bold statements of the stadium forms will read legibly from a distance as well as from close distance.

The western face of the stadium is exposed to the train line and surrounding areas and as such a feature is made of the contrast of the blue metal sheeting enclosure of western accommodation with the PTFE roof forms that form the majority of the stadium. The building will make a bold statement from the long distance western view. The building reveals itself in a more subtle way on the eastern side as one approaches the building at close range, never being presented with a long range view.

This eastern side will be the major pedestrian accessway on event day and the sense of discovery and understanding that people are on a journey to the stadium through a built up urban block is important in informing the design. The increasing sophistication and urbanisation of the Gold Coast we felt deserved and architectural response to site that is intelligent and exciting.

The roof architecture on the eastern and to a lesser extent southern sides responds accordingly to this design approach. The roof fabric of the main stadium roof steps back within the roof rafters breaking down the scale of this façade. Augmented to this is a change of fabric material to a more translucent mesh material that allows a certain level of transparency to the building on this side, especially at night time. Further the skirt roofs, as noted above, provides amore human scale at these two sides.

The stadium was placed as far as practically possible to the North–West part of the site so as to create a major urban space to the south–east. The south east corner is the most important for arrival of the majority of spectators and as such the presentation of the building responds to that. The stopping of the skirt roof in the corners and the upward curve of the PTFE fabric slot are done to give emphasis to this corner and signify the major entry point of the building.

*Figure 5. Presentation image on left showing stadium from South–East corner and construction photo taken in late September 2007.*

But on a pedestrian activity and flow aspect the creation and size of this South–East plaza is integral to the success of the stadium on game day but also to the amenity and pedestrian enjoyment of the precinct on non–event days. Our design response was to create a public plaza in this corner that was similar in nature, albeit smaller, to the Caxton Street End Plaza that exists at Suncorp Stadium in Brisbane by acting as an attractive catchment area for entering spectators, that allows for people to meet and dwell in an attractive external environment before entering the stadium.

This is achieved through the creative implementation of paving treatments, hard landscape elements such as precast concrete benches and soft landscaping elements that not only break down the scale of the open space.

Furthermore, it was felt that such a design approach responding to a just as important obligation to provide an appealing breakout space for the local population during the week, whether they be office workers or residents of the precinct.

**Building Sections**

Many section studies were undertaken to determine a suitable design solution as shown in Figure 6.

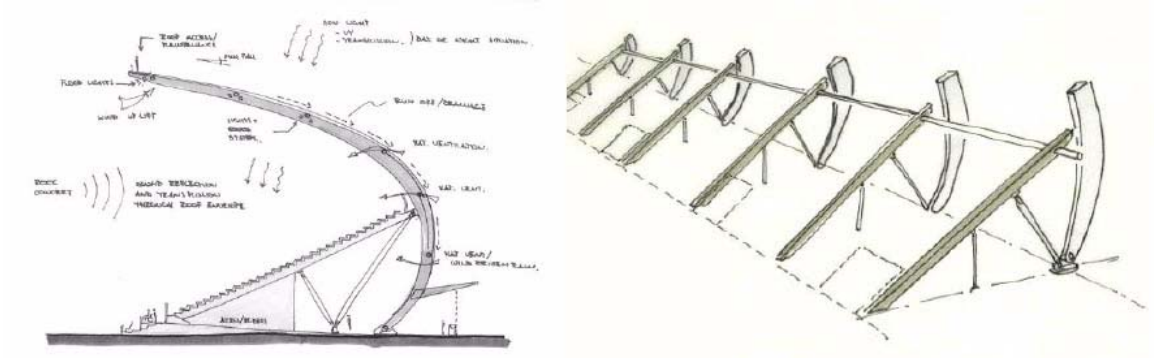

*Figure 6. Initial concept sketches for the seating bowl/roof section.*

The overall stadium section has been designed to avoid any below grade basements or pitch. This is partly due to flooding levels on the site, as well a method for achieving simple design and efficient construction. The stadium has two general sections – one template for the north, east & south stands and another for the west stand.

The north south & eastern sections are all a simple single tier with either toilets or food and beverage concessions located underneath. As noted before the raker beams that support the precast concrete plats that connect to the roof rafters hence making an integrated roof/seating tier frame system.

We have also designed the north , south & east section to be the same depth to reinforce the coliseum effect , as well as providing cost effective construction. With a capacity of 25,000 seats it is necessary to reinforce the coliseum effect to achieve maximum atmosphere, that can be so lacking on stadiums of this capacity. This was also fundamental to the decision to wrap the seating around the corners, so that atmosphere does not leak out of the stadium.

There are 'bites' taken out of the seating tier on all four sides. This allows for placement of scoreboards in the north–east and south–west corners. Additionally such void spaces create impressive atrium spaces in all the corners, notably in the south–east corner which is the 'front door' of the stadium and the North–West corner where a bar with associated milling space is being incorporated.

On the western side a separate suite tier has been designed to allow the close proximity of the suites to the field as well as a premium experience. (i.e. not at the back of a tier). The separate suite tier also allows the Level 2 function rooms underneath to have views of the pitch.

The overall section for the West stand differs quite substantially from the general section that is used for the North, South and East stands. This is due to the amount of extra accommodation found on the side such as all the BOH spaces, Function rooms and plant areas. This necessitates that the building form 'punches' out of the standard section enclosure. As it was a conscious decision to make this element a point of difference to the rest of the stadium whilst not dramatically changing the architectural language. As a result the West stand is mainly comprised of a 'pod' element that is clad in metal sheeting as opposed to fabric and is blue in colour as demonstrated in Figure 7 below.

*Figure 7. Presentation image showing west stand accommodation and September construction shot.*

Spectator viewing values, noted as C–Values, are minimum C90 which in comparable terms means that a high standard of viewing is provided.

The section has been carefully calculated to achieve the best standards of disabled provisions. Wheelchair and ambulant disabled positions have been distributed through all levels of the tiers.

As noted previously the leading edge of the roof has been design at a suitable height for sports lighting at a minimum 25m above the pitch to avoid the need for light towers, so that light spill is minimised. The sports lighting engineers designed the lights to work well at this height without the need for towers. Also this allows the building architecture to be defined by the building form rather than appendages.

The section also shows that the roof structure continues to ground level and provides the frame for the external wall envelope of the building. This allows an efficient cantilever and good coverage to the concourses from the sun but also wind driven rain.

**Ground Floor Plan**

Core to the success of any stadium is the ease of crowd circulation. Circulation within the stadium is planned with maximum clarity and simplicity.

The stadium has at grade circulation for the general admission seating. The entry and concourse are easily accessed from the plaza areas . The building perimeter is permeable and allows for a visual connectivity between the concourse and the external plaza and the street.

The general admission spectators access via a main bank of turnstiles on the south and east sides of the building. The concourse as shown in Figure 8 is a light, airy and naturally ventilated space that is sized to handle significant internal circulation flow of people and is serviced by the appropriate amounts of toilets and food and beverage concession units. Access to the seating bowl is by vomitory ramps that used to allow access for people in wheelchairs.

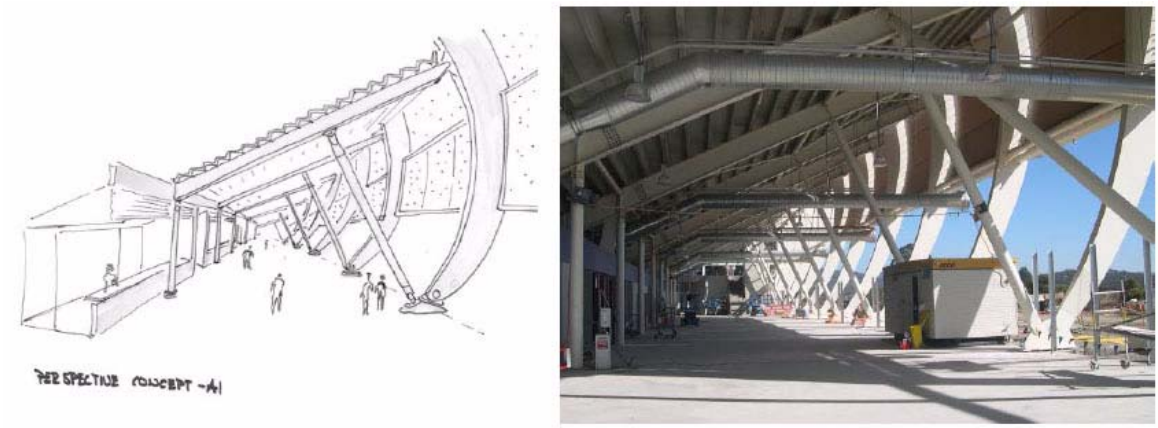

*Figure 8. Presentation image showing Eastern concourse accommodation and September construction shot.*

The majority of the back of house facilities are on the western side of the stadium , to give efficiency of planning and direct service lift access to the serviced levels above. The service road in this location is full 4.5M clear height to allow the players' coaches direct access to the facilities and pitch.

Corporate spectators located in the west stand enter the building in the south west corner of the building though dedicated turnstiles then move up to the members concourse on the western stand.

Suite patrons enter the stadium from the western corporate entry drop off using the lifts direct to level 3.

The western side of this level contains all the required back of house facilities, including players facilities, press facilities, Main Production Kitchen & store facilities, staff facilities and venue management.

**Level 1**

This level, specifically the concourse, has been designed to a slightly higher level of finish to accommodate the stadium members and corporate spectators who sit in the tier on the premium western side of the ground. Like the Level 0 concourse concession & toilets are located throughout the concourse and the crowd density of the concourse is significantly lower than the Level 0 concourse.

**Level 2**

This level locates the function room with views over the pitch with direct access to finishing kitchens. The finishing kitchen is located on this level as well as the radio commentator booths and the Coaches Boxes.

**Level 3**

This level locates the suites. The suite level is separated from the lower tier to provide a premium facility, have the best possible view of the field, as well as the ability to expand the viewing member facilities or function rooms below. The suite numbers and sizes are provided as per the brief. The suites are located in the closest proximity to the pitch of any major stadium in Australia to provide the best possible corporate facilities. The finishing kitchen is located with direct service lift access from the stores and main kitchen. The media suites are also provided in the key location to allow the best possible media coverage.

## Conclusion

The primary design aim of the stadium was to provide maximum atmosphere as well as providing a unique and relevant backdrop for the screening and promotion of the Gold Coast to a national sporting audience – in the most cost–effective manner.

Given there would not be the mass of 40,000 plus spectators to produce atmosphere the core objective was to produce a seating bowl and associated building envelope that would optimize and retain the atmosphere of any size crowd. As such the seating bowl is a tight wrap–around single tier with a small cantilevering suite level on the west side. All four sides are generally equal in size and the corners are cut–out.

Encapsulating this tight seating bowl is a steel framed skeleton of curved steel box rafters (over 2m thick at their widest) that transform from being the wall section to the roof section. The design approach has been to clad this frame in a material that was reflective of the Gold Coast 'feel' and climate of strong light, breeze and a general air of informality and recreation. PTFE roof fabric was chosen as it was believed the material best represented these qualities due to its lightness, transparency and fluid form.

When these three elements of intimate seating bowl, tight frame and PTFE cladding are combine what results is an atmospheric stadium of imposing form and original character that is truly reflective of the Gold Coast.