WITNESS COPY

Statement of Ian WHITEHEAD

2 September 2011

QFCI
Date: 4/10/11

Exhibit Number: 703

DOCUMENTS TO BE TENDERED – IAN WHITEHEAD

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Statement of Ian Whitehead dated 2 September 2011		1741391		
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QUEENSLAND FLOODS COMMISSION OF INQUIRY

STATEMENT OF IAN WHITEHEAD

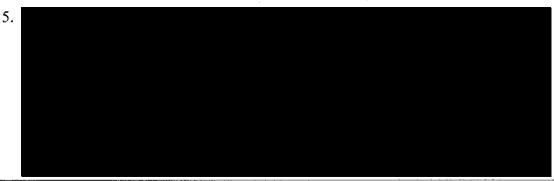
- I, IAN JAMES WHITEHEAD, of c/- Street Brisbane in the State of Queensland, Acting Chief Executive, Stadiums Queensland, solemnly and sincerely affirm and declare:
- 1. I am currently the Acting Chief Executive, Stadiums Queensland.
- 2. My usual role is the General Manager, Operations.
- 3. I have provided a response to the Commission's Requirement dated 29 August 2011 below.

Expert reports regarding flood risk

3. The QTC was built on a site known to be at risk of flooding. As such, the centre was designed and constructed to be generally above the 1 in 100 year flood level (Q100) of 7.9m AHD. Areas of the centre below this level were designed to be flood resistant by way of removable flood barriers which can be easily installed in the event of an impending flood.

Plans and maps regarding flood risk

4. Project documentation for the QTC includes architectural and engineering drawings which detail the arena design including elements relating to flood control. This includes elements such as landscaping and site works, the location of critical infrastructure and the design of the flood wall and flood gates.



Information provided to Stadiums Queensland by the Mirvae Group, the State of Queensland or the Brisbane City Council or any consultant engaged by any of them regarding flood risk

6. The concept and design of the QTC was initially undertaken by the Mirvac Group in conjunction with the former Sport and Recreation Queensland (SRQ). Stadiums Queensland (then the Major Sports Facilities Authority) became involved in the project in 2007 after construction had already commenced, following a decision by then Premier Peter Beattie that the Major Sports Facilities Authority should ultimately own and manage the facility on behalf of Government. At that time, copies of relevant documentation were handed over to SQ. SRQ maintained an involvement in the project until its completion in December 2008 when the QTC land was transferred from SRQ to SQ. Documentation relating to decision-making prior to SQ assuming control is the responsibility of Sport and Recreation Services within the Department of Communities.

Any information gained by independent investigation by Stadiums Queensland.

7. Marsh Pty Ltd was engaged by Stadiums Queensland in 2009 to develop a site-specific Flood Emergency Response Plan (FERP) for the QTC. This involved a flood risk assessment and identified the building levels compared to the predicted flood levels in the local area. The FERP also contains procedures for preparing for and minimising the impact of a flood. A Risk Report and Underwriting Report were also prepared as noted in paragraph 5 above.

Flood related plans or procedures put in place by Stadiums Queensland to deal with the flood risk at the Queensland Tennis Centre, including plans related to a potential flood which occurs during the Brisbane Internationals tournament.

8. Given the risk associated with flood at the QTC and to maintain appropriate insurance cover for flooding, a site-specific Flood Emergency Response Plan (FERP) was developed for the Queensland Tennis Centre in October 2009. The FERP describes the potential hazard, training and preparation requirements, procedures to be undertaken by key centre staff in the event of a flood and a flood recovery plan. The FERP also contains a copy of the Brisbane City Council Floodwise Property report, Venue Flood Level Plan, a Flood Checklist and a manual for the use of the flood barrier system. The FERP is a general flood response plan relating to flooding at any time and does not contain any specific procedures regarding a potential flood during the Brisbane International tournament event.

What parts of the Tennis centre that were inundated with flood waters

- 9. Water inundated the following areas of the QTC:
 - (a) All of level 1 of the Pat Rafter Arena building to a depth of approximately three to four metres to the underside of the level 2 podium slab. Rooms on level 1 that were inundated include Change Rooms, Gymnasium, Doping Room, Maintenance Workshop, Communication Room, Store Rooms, Cleaners' Room, Chemical Store, Maintenance Office, Centre Court, Lower Tier of the Arena seating, Tournament Control, Multi-Purpose Room, Two Lifts, Main Refrigeration Plant Room, Undercroft areas and various Amenities;
 - (b) Lower level grass courts (x2) and clay courts (x4);
 - (c) Podium level hard courts (x 9);
 - (d) Car park;
 - (e) Grounds maintenance shed and compound;
 - (f) Pump shed.

10. Although the flood barriers were installed prior to the flood, water initially entered the facility by way of backflow from the river via the facility's drainage network before ultimately flowing over the flood barriers. The flood barriers were constructed to a height of 8.6m AHD, 700mm above the Q100 level (7.9m AHD). The flood reached a level of 9.1m across the site.

Property damage caused by flood waters

- 11. Property damage at the QTC totalled approximately \$6 million. Damage caused by flood waters include:
 - (a) All Electrical Services including the External switchboard in the Eastern Car Park, Hydraulic Services, Mechanical Services, Refrigeration, Fire Services, Communication Systems, Security System, IT Infrastructure, Irrigation System and two Lifts;
 - (b) All Level 1 finishes including partitions, doors, walls, ceilings, carpets, tiles;
 - (c) All Level 1 fittings, fixtures and equipment (FF&E) including furniture, gym equipment, tennis equipment, grounds maintenance equipment, audio equipment, IT equipment and communications equipment.
- 12. For insurance purposes SQ engaged the services of a Quantity Surveyor to detail the damages throughout the QTC. A copy of this detailed report can be provided if required.

Effect on access routes (including period of time access was cut)

13. The road to the north of the QTC, King Arthur Terrace was inundated with flood water between Fairfield Road and the QTC for approximately one day until flood water receded. The site remained accessible from the western end of King Arthur Terrace during the flood.

Effect on structural integrity of any buildings or other items at the centre

14. The flood did not have an impact on the structural integrity of any buildings or structures on the site as the facility is constructed on pile foundations. A survey was taken of the levels across the centre court in Pat Rafter Arena to determine if any building movement occurred, but no structural movement was found to be evident.

Closure of the centre

15. Due to the extent of damage and loss of critical services, such as electrical, mechanical and fire services, the QTC was closed immediately following the flood and all tenants vacated the centre until temporary electrical and fire services could be installed to their tenancy areas. Following cleaning of the court surfaces and testing for biological contaminants, the outdoor hard courts, along with the Tennis Qld offices and UQSport Pro Shop and Court Hire services, reopened for public use on 7 February 2011. The four clay courts and two grass courts are still closed due to the extensive damage sustained. Centre Court on level 1 of the Pat Rafter Arena has also not been reopened due to reconstruction works in the immediate vicinity.

Clean-up efforts required

16. The clean-up process commenced as soon as the flood water receded and was in full operation within two to three days. The clean-up involved numerous contractors and approximately 20 to 30 QBuild staff and lasted for approximately three weeks. A significant amount of building debris and damaged equipment was dumped off site and cleaning staff were hired in to pressure clean large areas of the Arena including the fixed seating that went under water. The clean-up phase cost approximately \$750,000.

Remediation works required

17. Substantial remediation and reconstruction works are required at the QTC following the flood and is expected to cost approximately \$5 million. All internal fitout of level 1 of the Pat Rafter Arena has been removed and needs to be rebuilt, including all walls, ceilings, floor treatments, electrical, mechanical, communication and fire services, security infrastructure, IT infrastructure, built in joinery, furniture, plant and equipment. Significant portions of landscaping and irrigation also required replacement. The majority of horticultural equipment and workshop tools were also replaced. Lift services required extensive reinstatement works. Four clay courts and two grass courts are yet to be completely resurfaced. The Quantity Surveyor's report noted in 3b above provides full detail of the works required.

Any additional mitigation works proposed to protect the centre

- 18. Measures will be taken during the reconstruction of the damaged areas of the QTC to assist in mitigating the potential damage from future flood events. These measures include the protection of electrical switchboards by raising above the flood level or bunding their enclosures, the construction of new partitions with flood resilient materials such as concrete blockwork and moisture resistant wall linings and the use of tiles and painted membrane floor finishes. The air conditioning plant will be raised to the extent possible to provide a greater level of flood resistance. Amendments will also be made to the FERP regarding procedures for a greater extent of relocation of furniture and equipment to higher levels of the centre in the event of a major flood.
- 19. The immediate priority for SQ is to oversee the reconstruction of the QTC in time for the 2012 Brisbane International Tournament.

Any long term impacts on the site.

20. There are no long term impacts on the site. All damage caused by the 2011 flood event can be rectified.

Any further investigations, reports or advice received regarding the flood risk of the Queensland Tennis Centre or the effect of flood on the Queensland Tennis Centre since the January 2011 floods.

21. No further investigations, reports or advice have been commissioned or received by Stadiums Queensland regarding flood risk/effect at the QTC since the January 2011 flood. The consultant team involved with the reconstruction of the centre is considered to have sufficient expertise to ensure that all measures considered prudent to avoid or minimise the effect of future flood events will be implemented during the reconstruction.

I make this solemn declaration conscientiously believing the same to be true, and by

virtue of the provisions of the Oaths Act 1867.

n James Whitehead

Taken and declared before me, at Brisbane this day of berrented 2011

Solicitor/Barrister/Justice of the Peace/Commissioner for Declarations



Affiliated FM Risk Report

Location Findings Stadiums Queensland

Queensland Tennis Centre 190 King Arthur Terrace Tennyson, Queensland 4105 Australia

All in One First Baseline Risk Evaluation

Visit by:

Visit date:

21 April 2009

Conference with:

Events Manager

Principal Site Activity

The Queensland Tennis Centre, set on the banks of the Brisbane River, is the first sporting venue to contain all three of the Grand Slam playing surfaces within the one location. There are four clay courts, two grass courts and 17 cushion acrylic (plexicushion) courts, all which meet the International Tennis Federation standards. The Pat Rafter Arena has the capacity to hold 5,500 spectators around the international-standard centre court and has 20 corporate suites which can be rearranged into larger function rooms when required.

Understanding the Risk at this Facility

Due to the geographical location of this stadium, natural hazards such as Brisbane River's flooding events and high winds create the most significant exposure for Stadiums Queensland's ability to host advertised events at this location. Additionally, although the materials used to construct stadiums are typically noncombustible, the office spaces, corporate suites and cool rooms in kitchen areas contain a sufficient amount of combustible material to fuel a major fire.

Should the courts or the building structure of the Pat Rafter Arena suffer damage as a result of either a flood or windstorm, regular training/recreational sessions and scheduled tournaments will be forced to be postponed for a lengthy period of time or held at another venue, whilst the necessary clean-up operations are performed and repairs are made. Whilst the likelihood of natural hazard events occurring cannot be controlled, the likelihood of a major fire occurring at this facility can be significantly decreased by establishing effective management policies that ensure the installed fire protection systems are always in service and that ignition sources are strictly controlled.

FM Global's best advise on how to address the exposures identified during the evaluation are included within this report to aid management's efforts in achieving risk improvement at this location.

Management of Exposures

Certain potential hazards and conditions were evaluated at this facility. Completion of the following items will help lower both the frequency and severity of losses and minimise the possibility of costly interruptions to your business.

09-04-001

Formalise the response procedures for Brisbane River's flooding events.

Emergency response procedures for flood events should be developed and documented within the emergency response plan. The procedures developed should include the following basic components:

- A reliable flood warning method.
- A person who has the authority to activate the plan.
- A clear list of responsibilities for the key leaders.
- Proper de-energisation and shutdown procedures.
- Actions to reduce the damages by using available resources and staff.

/ Account:

A recovery and clean-up plan.

This report is provided to you for informational purposes only to reduce the possibility of loss to property by bringing to your attention certain potential hazards or conditions. You must make the decision whether to take any action. Affiliated FM undertakes no duty to any party by providing this report or performing the activities on which it is based.

09-04-001 continued

The Hazard

Although the government built Wivenhoe Dam as a flood control mechanism for Brisbane River, flood waters laden with silt and debris are still expected to submerge large sections of this centre during Brisbane River's high and moderate hazard flooding events unless the flood barrier system is promptly put in place. The flood mitigation and recovery procedures that have been developed should be documented to ensure that the action plan remains available to site personnel if there is a change in management in the future.



Documenting what actions to take will help ensure the flood barrier system is effectively used.

Status

Local management advised that they have been trained to deploy the flood barrier system and the response procedures are currently being drafted with the help of the broker.

19-04-002 Ensure that the concealed clip roof is appropriately secured to the building structure's purlins.

Through-fasteners should be used to secure sections of the roofing system to the building's structural steel. This extra securement should be applied to the corners and edges of the concealed clip roofing system wherever it has been used.

09-04-002 continued

The Hazard

During summer, south-east Queensland has been known to experience tropical storms with strong winds. These winds can create large uplift pressures on concealed clip roofs that have not been appropriately secured to the building frames purlins.

Excessive uplift pressures can not only cause damage to the roof, but are known to cause roofing panels to be torn from the supporting structure. If the contents of the corporate suite and office areas are exposed to the elements, significant property damage is expected to result, rendering these areas useless until repairs have been completed.

Through-fastening the corners and edges of the roofing system will increase the roof's resistance to these uplift pressures, reducing the potential amount of damage that could result.



The existing concealed clip roof requires through-fastening to ensure it can withstand high winds.

Status

The centre's construction company is arranging for information relating to the strength of this roofing system to be forwarded to FM Global. Once received, detailed advice on how to address this issue with be provided to Stadiums Queensland.

09-04-003

Forward the technical details and flow test results of the sprinkler system to FM Global.

The technical details of the fire booster pump controller's fuse/circuit breakers, along with the system's flow test results should be forwarded to FM Global.

)9-04-003 (continued	
	The Hazard	Supplying this information will provide FM Global with the means to confirm whether the fire protection system is capable of controlling a fire within the centre's suite and office areas reliably. Once confirmed, this information will be used in the future to monitor the system's performance, aiding preventive maintenance efforts.
	Status	The final conference did not focus on this recommendation.

09-04-004

Establish a weekly inspection program for the fire protection system's control valves.

A member of the maintenance staff should visually inspect the control valves on the fire protection system weekly and document the following:

- The state (locked open/shut) that the valve was observed to be found in.
- The state (locked open/shut) that the valve was left in.

In addition, these fire protection valves should be physically exercised (fully closed and then reopened) annually.

The Hazard	In contrast to other types of water supply valves, closed fire protection valves do not impact normal operations or give evidence of being shut until they are required to respond to a fire event. FM Global loss history includes many instances of valves being shut "temporarily" but remaining in this state for weeks, months and even years.
	Documenting the state of each valve, before and after the weekly inspection, will help ensure that valves closed due to maintenance or building operations only impair the fire protection system for the minimal amount of time.
Status	Local management understood the benefits of inspecting the state of the valves regularly and advised that it would be arranged for a member of the maintenance staff to perform this duty.

u9-04-005

Establish formal management procedures for fire protection system impairments.

Formal fire protection impairment management procedures should be used to manage all sprinkler control valve closures, regardless of the reason for, or duration of the impairment. FM Global should be notified of all impairments relating to the fire protection system.

If Stadiums Queensland decide to develop their own system opposed to directly implementing the FM Global Red Tag Permit System, it is advised that all items in the FM Global system be included within the policy that is implemented.

09-04-005 continued

The Hazard

A sprinkler control valve in the closed position prevents water from flowing through particular sections of piping in the fire protection system. This results in part, sometimes even all, of the automatic sprinkler system becoming impaired until the valve has been returned to the fully open state. Isolated or faulty components within the system can also prevent it from operating as designed. Should a fire occur whilst the system is impaired, the likelihood of the fire growing beyond control is increased.

It is therefore necessary to take extra precautions whilst the system is impaired to ensure that a fire is not ignited whilst the system is out of service and that management utilise all resources so that the system is returned to the fully operational state as soon as possible.

Status

Local management advised that as the facility is still under the builder's warranty period, all sprinkler system impairments are expected to be managed by the builder.

09-04-006

Add a fire protection attendant role to the emergency response organisation.

A fire protection attendant role should be added to the emergency response team of this facility. The duties of this role should be documented and alternative personnel should be assigned to the position to ensure all shifts will have at least one person that has been trained to perform this role.

The specific duties that should be performed by this role have been outlined in the *Technical Detail* section below.

The Hazard

The amount of damage sustained from a fire event can only be minimised if the installed protection system can continue to deliver the maximum amount of water to the fire area, gaining control of the fire until the fire brigade is able to move in and completely extinguish it.

If the sprinkler booster pump has failed to start or one of the sprinkler control valves is shut or partially closed, it is likely that the automatic fire protection system will not be able to deliver the amount of water required to control the fire during the early stages of its growth. Having properly trained personnel check that the pump has started and appropriate valves are fully open as soon as a fire alarm has been raised will help ensure that a fire is responded to in the quickest amount of time possible.

Technical Detail

The fire protection attendant (and all alternates) should be knowledgeable of where the controls for fire protection equipment are located, how to manually start the fire booster pumps and what sprinkler control valves look like in the open state.

If safe to do so during a fire event, this person should promptly proceed to the stadium's pump room as soon as a fire alarm has been raised and verify that the fire pump has started and that all critical valves are open. If the pump hasn't started, this person should manually activate it. If any critical valves are identified as being shut, this person should also return them to the fully open state.

09-04-006 co	Technical Detail	As the fire protection attendant will be required to proceed immediately to the pump room during a fire event, it is advised that this position be assigned to personnel who are not required to assist with evacuation procedures.
	Status	Local management understood the benefits of having someone perform these duties in a fire emergency event and advised that it would be considered for

09-04-007 Establish a policy for managing hot work procedures.

developed.

Any procedure that produces high levels of heat, sparks or open flames should only be undertaken if authorised by a member of the local senior management team. The actions taken to properly prepare the affected area and appropriately monitor it for fire events should be recorded. As hot work operations rarely occur at this facility, it is advised that the FM Global Hot Work Permit System be utilised as part of this policy.

inclusion in the site specific emergency response plan that is currently being

Personnel responsible for issuing hot work permits or performing hot work operations are also encouraged to complete the free hot work online training course available from http://training.finglobal.com.

The Hazard	Hot work operations such as welding, cutting and grinding will occasionally need to be performed at this centre as part of utility services maintenance. Hot work operations by nature are significantly hazardous to locations like this, as they can introduce high energy ignition sources into office and function areas where a significant amount of combustibles are present.
	FM Global's loss history has shown that hot work is the second largest cause of fires at insured properties. Due to the infrequency of hot work at this facility, it is imperative that steps are taken to effectively manage this hazardous process. Without utilising the FM Global Hot Work Permit or a similar check-list, the risk of a fire being initiated by hot work is significantly increased.
Status	Local management advised that as the facility is still under the builder's warranty period, all maintenance procedures are expected to be managed by the builder.

09-04-008 Add response procedures for addressing a water leak to the emergency response plan.

Procedures for addressing a domestic/air-conditioning water leak event should be developed, documented and communicated to the local management team. The documentation distributed should include the details of where the domestic and air conditioning systems' isolation valves are located and what areas they control the flow of water to.

/ Order 10:

00 01 00	8 continued	
	The Hazard	Water leaking from domestic water pipes and air-conditioning systems has been responsible for a significant number of losses in operations similar to this sporting venue.
		If a domestic or air-conditioning water line bursts or leaks and the location of the isolation valve is unknown to those closest to the affected area/s, a significant amount of damage is likely to result to the suites' or function rooms' internal finishings and furnishings in the time it takes for the leak to be appropriately addressed.
		Documenting how to promptly isolate the source of domestic water leaks and making the management team aware of such procedures will increase the likelihood that a water leak will be promptly addressed, helping to minimise the amount of damage that results from such an event.
	Status	Local management understood the benefits of defining water leakage response procedures and advised that it would be considered for inclusion in the site specific

Ongoing Services

FM Global is available to provide support in all areas of property loss prevention. These services include:

emergency response plan that is currently being developed.

- Development of specifications for projects such as new construction, automatic protection systems, and process safeguards
- Review of related project plans
- · Assistance in implementing and managing loss prevention programs
- On site review and acceptance of completed projects
- · Assistance in managing impaired protection systems

For access to these services, contact one of the following:

Sydney Office:

FM Insurance Company Limited 255 George St. Level 15 Sydney, NSW 2000 Australia [61] (2) 8273 1400

Account Engineer:

Affiliated FM
A Division of FM Insurance Company Limited
Sydney Office
255 George St.
Level 15
Sydney, NSW 2000
Australia

Reference Information

Location Findings

Stadiums Queensland Queensland Tennis Centre 190 King Arthur Terrace Tennyson, Queensland 4105 Australia

All in One First Baseline Risk Evaluation

Visit by:

Visit date:

Site Contact:

Final Conference Attendees:

Location Index Number:

Account Number:

21 April 2009

Venue Manager at

Events Manager

AUG778.00-01

October 2009

Flood Emergency Response Plan (FERP)

Queensland Tennis Centre / Tennis Queensland

MARSH

MARSH MERCER KROLL

GUY CARPENTER OLIVER WYMAN

Document Owner

Tom Larner, CEO Tennis Queensland

Document Control

A documentation control process is required to enable version identification of all copies of this FERP. This is critical in ensuring that the most current information is available and being used during a response to an incident.

This document is to be controlled in accordance with current document control policies currently utilised by the Venue. Any changes or recommendations for change should be notified via the Document Owner.

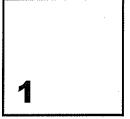
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July 2009	Draft	Marsh	Document creation	December 2009
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4				

Disclaimer

This document has been prepared to the requirements of Queensland Tennis Centre (Tennis Queensland) in conjunction with Stadiums Queensland and is based upon the information provided or obtained through consultation during 2009. Marsh Pty Ltd is unable to vouch for the accuracy of the information provided by either Queensland Tennis Centre or Stadiums Queensland and as such does not warrant the accuracy of any supportive findings contained in this document. This document is not intended to replace legal; actuarial or other professional advice. Failure to mention any matter that may constitute a breach of statutory obligation does not imply that no such breach occurs. This document has been prepared for Queensland Tennis Centre and Stadiums Queensland on a specific and agreed basis and should not be relied upon by any other party. Marsh Pty Ltd, its directors and employees do not accept any responsibility for errors or omissions in this document, whether by negligence or otherwise.

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Apı	pendix G: Level 1 and 2 Room Inventory



Policy

Tennis Queensland and the management of the Queensland Tennis Centre are committed to providing a safe environment for all stakeholders.

Queensland Tennis Centre is subject to potential flood events that could have the potential to cause damage to infrastructure and ultimately to patrons and/or venue staff.

Venue management are committed to reducing the possibility of injury and/or infrastructure damage through the implementation of this Flood Emergency Response Plan (FERP).

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The Hazard

Queensland Tennis Centre is located approximately 100 m from the Brisbane River. Flooding along the Brisbane River is caused by both heavy rainfall in Brisbane and the hills surrounding Brisbane. The river is also subject to tidal influences. Whilst flooding might be predicted to usually occur in the rainy season, flooding can occur all year round.

The highest flooding source is the Brisbane River. Brisbane City Council generated analysis has provided the following flood level analysis for the venue (refer to Appendix A for complete report)

Measure	Height	Notes
Minimum Ground Level at venue	3.1 m AHD ²	
Maximum Ground Level at venue	13.7 m AHD	
Highest Defined Flood Level (DFL)	7.9 m AHD	The flood event adopted by a local authority for management of development.
Approximate depth of flooding on this property	4.8 m	
(ie DFL less minimum ground level)		
Minimum habitable floor level	8.4 m AHD	Podium level is 9.6 m AHD
(ie, Highest defined flood level (DFL) in metres + 500mm)		The top of the drive way in south east corner of venue (ie, where flood barrier is to be fitted) is est. 6.68m AHD

¹ Brisbane City Council - Floodwise Property Report - Report Reference 797593 - Dated 13 March 2009

Marsh

² AHD – Australian Height Datum – The national vertical/height benchmarking survey reference based on mean (average) sea level.

In the event of a severe flood event, if the venue does not carry out this plan and fails to install the flood barrier in the south east corner, then flood waters will inundate Level 1. As a result, areas including the maintenance area, centre court (incl electronic score boards), gym area and equipment, scoring and media systems, storage rooms, changing rooms and undercroft areas will be submerged by flood waters.

NOTE - There is currently no contingency to protect the eastern tennis courts from a flood event. However, in the event of a flood event and where practical, all equipment in and around these courts (excl pad transformer) should be relocated above the predicted flood level.

Indicators of a Flood Event

The Bureau of Meteorology provides forecasting and flood warning information. Brisbane City Council works in partnership with the Bureau to interpret warnings and provide advice on possible flood impacts and effects. The Bureau issues a number of different types of warnings before and during weather events which could result in flooding within the Brisbane area.

Triggers to listen and watch out for include:

- flood warnings
- severe weather and thunderstorm warnings, especially those mentioning the possibility of flash flooding
- tropical cyclone warnings include warning for storm tide
- prolonged heavy rain
- rising creeks and rivers, and localised pooling of water

Warnings are sent from the Bureau to media, Council, Department of Emergency Services and other agencies involved in managing severe weather and flood response activities. The following table summarises ways for the venue to access flood warning information:

Source	Access	Contact Information
Internet	Flood warnings, River Height Bulletins and other weather related data is available on the Bureau of Meteorology's website	Bureau of Meteorology:
		http://www.bom.gov.au
		Queensland Flood Warning Centre: http://www.bom.gov.au/hydro/flood/qld
		Current River Heights: www.bom.gov.au/cgi- bin/wrap fwo.pl/?IDQ60286.html
Radio	Tune in your radio to a relevant station	Radio stations, particularly the local ABC, and local commercial station, broadcast Flood Warnings and River Height Bulletins soon after issue or as part of the news services

Source	Access	Contact Information
Television	Watch out for televised weather	All free-to-air channels
	updates	The Weather Channel (Foxtel /Austar)
Local Response Organisations	Refer Key Contacts List	These include the Councils, Police and State Emergency Services in the local area
Telephone	Flood Warnings are available	Flood Warnings Tel: 1300 659 219
	through a recorded voice retrieval system, along with a wide range of other weather related and climate information.	Tropical Cyclone warnings Tel: 1300 659 212
Stadiums Queensland		Contact Stadiums Queensland GM Assets and/or Venue Manager QSAC

NOTE: Brisbane City Council is currently developing an online flood monitoring service – "Floodwise" - which is only currently available to selected emergency response people. Access to this service by the venue should be further investigated.

Observed / Predicted River Heights & Flood Warnings

For the Brisbane River and creeks where specialised rainfall and river height gauges have been installed, flood warnings and river height bulletins will describe flooding as 'Minor', 'Moderate' or 'Major'. The following table describes these terms in more detail:

Warning	Description	
Minor Flooding	Causes inconvenience. Low-lying areas next to watercourses are inundated which may require the removal of stock and equipment. Minor roads may be closed and low level bridges submerged.	
Moderate Flooding	In addition to the above, the evacuation of some houses may be required. Main traffic routes may be cut by flood waters	
Major Flooding	In addition to the above, extensive areas are inundated. Properties and suburbs are likely to be isolated and major traffic route likely to be closed. Evacuation of people from flood affected areas may be required.	

Flood warnings for the Brisbane River contain a summary of the existing rainfalls and river heights, and for larger floods, predictions of river heights at key locations such as Moggill, Jindalee and Brisbane City. Whilst Moggill and Jindalee are some distance and up stream from the venue, they may provide an indication of the potential flood risk to the venue. Predicted heights may also be given with the time that the height is expected to be reached.

The following survey data provides Flood Warning River Heights under the three flood warning categories:

River Gauge Station Name		Flood Height (m AHD)	
	Minor	Moderate	Major
Moggill	10.0	13.0	15.5
Jindalee Alert	6.0	8.0	10.0
Brisbane City Alert	1.7	2. 6	. 3. 5

Source: www.bom.gov.au/hydro/flood/gld/networks/section6.shtml

In assessing whether the venue is potentially exposed to a flood event, predicted river heights should be compared against the following:

- the above survey data
- the current river heights (www.bom.gov.au/cgi-bin/wrap_fwo.pl/?IDQ60286.html)
- the FloodWise report data (see over) for the venue

ARI ³ Flood Level	Height	Venue Areas Impacted ⁴
500 Year	<9.00 m AHD ⁵	Same as 100 year ARI but water crests flood barrier and/or enters stadium basement ports (approx 8.0-8.4 m AHD). Potentially, water covers upper level court as well (9.0 m AHD).
100 Year or 7.9 m Highest DFL AHD ⁶		A 1:100 yr flood event will inundate the eastern end of the venue (ie, east of the eastern retaining wall). Areas impacted will include lower tennis courts (5.2-5.4 m AHD) and car parking areas.
		The flood waters are estimated to rise to 7.9 m AHD, a level above the top of the venue service road (south east corner - 6.90 m AHD) but below the top of the flood barrier (8.2 m AHD) and below the ventilation ports (approx 8.0-8.4 m AHD) in the eastern retaining wall and maintenance shed (8.0 m AHD).
	Plan includes procedure for implementing flood barrier.	
	Note - Centre Court/Level 1 is 4.5 m AHD.	
50 Year	6.6 m AHD ⁶	A 1:50 yr flood event will inundate the eastern end of the venue (ie, east of the eastern retaining wall). Area impacted will include lower tennis courts (5.2-5.4 m AHD) and car parking areas.
		The flood waters are estimated to rise to 6.6 m AHD, a level just below the top of the venue service road (south east corner - 6.9 m AHD).
		Plan includes procedure for implementing flood barrier.
20 Year	4.4 m AHD ⁶	

All measurements are as provided to Marsh by Affiliated FM, unless otherwise indicated.

Refer to Appendix B for site plans with overlay of flood scenarios.

Knowledge of the river gauge survey data, the above ARI data and the predicted river heights will allow the CEO to make an informed assessment of the venue's exposure to the flood event and any requirement to activate the FERP.

Marsh

³ ARI – Average Recurrence Interval - The probability of experiencing a flood of a particular magnitude is expressed an ARI in years. See Appendix A for Floodwise report containing all definitions

⁴ Based on Affiliated FM surveys

⁵ Source: Affiliated FM data

⁶ Source: Brisbane City Council flood wise report

Plan Activation

It is the responsibility of the **CEO Tennis Queensland** to monitor the predicted flood level heights against the known heights for the venue (ie, the height that water begins to enter the venue boundary and the height at which each venue level would be affected).

Should the predicted flood levels be such that the venue will be impacted by flood waters, then the CEO Tennis Queensland will activate this plan.

In the absence of the CEO Tennis Queensland, the **Facilities Development Manager Tennis Queensland** will have the authority to activate the FERP.

The following plan sets out the requirements under the FERP for the Queensland Tennis Centre.



Plan Preparation

Activities

The following actions should be undertaken in preparation for the implementation of this FERP:

- Undertake an annual review of the plan and action steps
- Undertake training of key venue management and staff
- Assignment of a flood defences inventory (ie, barriers, sand bagging)
- Implementing a reliable flood monitoring system that gives adequate warning time thus allowing the plan to be successfully completed.

The CEO Tennis Queensland is responsible for actioning the above items. The following sets out a time scale for undertaking the above:

Timing	Responsibility	Action
June and December of Every Year	CEO / Facilities Development Manager	 Review the FERP and update as required. Review room allocations on each level and reallocate responsibilities with FERP as required. Update Inventory Lists for each room
July of Every Year	Head Groundsman	 Take out flood mitigation gates for testing and training in implementation of barriers. Review water pumps to ensure operability (ongoing maintenance) Ensure sufficient stock of sand bags and sand at venue
July of Every Year	CEO	 Working with Stadiums Queensland, review / liaise with Brisbane City Council's Flood Forecasting and Warning System department and review warning system and method

Timing	Responsibility	Action
August of Every Year	CEO / Head Groundsman	 Conduct training for the FERP Management Team and Designated Deputies that are listed above. Ensure leaders have written copies of the plan.
August of Every Year	Head Groundsman	 Ensure the electric and gas utility shutoff procedures are current and allocation of responsibilities are correct. Review list of contractors in case of emergency. Update as required.
All year	CEO	 Monitoring of flood forecasting (eg, BCC, BOM). Frequency of monitoring should be based upon flood prediction levels: If Low: Weekly monitoring If Moderate: Daily monitoring If High: Monitoring Every 2 hrs.

Refer to Appendix C for checklist of actions.

Training

It is important that this FERP is maintained and updated regularly to ensure that information remains current. It is recommended that the FERP be reviewed every 6 months.

It is critical that staff are trained on the plan, including implementation of the flood barrier.

Refer to Appendix D which includes a template for documenting training undertaken by venue staff



The Plan

Objective and Timings

The objective of this FERP is to reduce the damage to the venue and business interruption by planning for the flood event in advance. The Venue will raise or relocate key items above the 100 yr. level where practical.

Assuming the venue has 48 hour warning of a flood event, this plan has been set up to accomplish all of its actions in 36 hrs, leaving a 12 hrs period to respond to unforeseen problems or the uncertainty of the flood prediction. The plan is activated immediately following issuance of a flood warning by the CEO Tennis Queensland as a result of information obtained from monitoring and interpreting flood warning sources.

This plan's time line is built around when the flood warning is issued:

- Severe flood warning issued = 0 hrs,
- Targeted time to have plan ready = 36 hrs,
- Predicted time the flood hits = 48 hrs.

NOTE – this plan has been set up such that the flood warning is 48 hours. However, if the warning is less than this, then the plan's timing will be updated under the CEO Tennis Queensland's guidance.

Activation and key responsibilities

The following sets out the authority for activation of the FERP and those personnel with key responsibilities within the plan:

Activation of FERP

 The CEO of Tennis Queensland is in charge of the overall plan and has the authority to activate the plan.

Marsh

 The Facilities Development Manager for Tennis Queensland has the authority to activate the plan if the CEO of Tennis Queensland is not available.

Flood Monitoring

 The CEO of Tennis Queensland is responsible for monitoring the Flood Forecasting and Warning System and calling in the managers once the plan is activated.

Implementation of Flood Barrier

 The Head Groundsman is responsible for implementing the flood barrier in the south east corner of the venue (the gates are stored in the undercroft, access via maintenance workshop on Level 1)

Notification

In the event that the FERP is activated, under the leadership of CEO Tennis Queensland, the following personnel will action the FERP and supervise their staff in each respective areas as per the actions within this plan:

Organisation	Name / Position	Mobile	Designated Deputy
Tennis Queensland	Tom Larner CEO		
Tennis Queensland	Facilities Development Manager		
Tennis Queensland	Head Groundsman / Flood gate operator		
National Academy	National Coach		
UQ Sport	Venue Manager		
Brisbane International	Tournament Coordinator	,	
Stadiums Queensland	Venue Manager QSAC		lan Whitehead

Marsh

The following venue personnel will ensure that key stakeholders are advised of the FERP's activation:

Functional Area	Position	To be notified of FERP activation
Tennis Queensland	CEO	 Stadiums Queensland GM Operations
		 Stadiums Queensland (QSAC) Venue Manager
		 Tennis Queensland President
		 Tennis Australia CEO
		 Tennis Queensland management and staff
		 National Academy Manager
		 Brisbane International Tournament Director
Tennyson Stadium Venue Management (UQ Sport)	Venue Manager	 University of Queensland venue personnel (including Pro Shop, Café, Court Bookings, Coaches)
		 University of Queensland Sport management
National Academy	National Academy Manager	 National Academy management and staff
Brisbane International	Tournament Director	Events team

Appendix E includes a list of phone numbers for other key emergency agencies and contractors.

The Plan's Actions

Once a Severe Flood Warning has been issued, the following actions (see over) are the key pre-planned emergency actions that are designed to reduce the loss. These key actions can be split into four categories:

- keeping flood waters out of buildings
- keeping flood waters away from equipment, stock and supplies
- limiting damage to the venue (if water can not be kept away),
- reducing the recovery time.

Each task details the action required, when the action should be undertaken and who is responsible for the action. Actions have been prioritised based on 48 hours warning – however should this be reduced then the actions will require re-prioritising under the guidance of the CEO Tennis Queensland.

Time after issuance of Venue Flood Warning	Responsibility for Action	Action	
0 hrs	CEO Tennis Queensland	CEO notifies Stadiums Queensland (VM of QSAC) and GM Ops (SQ) of Flood Warning for venue. This will include providing the predicted time until flood event and the estimated flood level (against venue levels)	
0 hrs	CEO Tennis Queensland	CEO will activate the FERP. Amend timescales for FERP actions depending on estimated time of flood event.	
		The Facilities Development Manager has the authority to activate the plan if the CEO is on holiday / away on business / cannot be reached immediately.	
		NOTE – If event is planned at venue, implement Business Continuity arrangements accordingly	
0 hrs	CEO Tennis Queensland	The CEO will notify key venue management that the FER has been activated: - Facilities Development Manager (TQ) Head Groundsman (TQ) - National Coach / - Venue Manager (UQ Sports) Tournament Coordinator - VM QSAC (SQ)	
Every 2 hrs after Venue Flood Warning is issued	CEO Tennis Queensland	CEO will continually monitor flood warnings and advise ke venue management of any changes to warning.	
1 hr CE	CEO Tennis Queensland	The CEO will have the Inventory Lists (see Appendix F) for each room on each Levels 1 and 2, printed and distributed to: - Facilities Development Manager (TQ) Head Groundsman (TQ) National Coach Venue Manager (UQ Sports) Tournament Coordinator	
		Develop a list of unoccupied rooms / suites on Level 3 that can allocated for storage.	
		Determine personnel resources within each department required to move contents of each room above predicted flood level. Source specialist contractors where required. (eg, scoreboards, heavy gym equipment)	
1 hr	CEO Tennis Queensland	CEO to Issue instruction to install flood barrier at south east corner of venue. Head Groundsman to install flood barrier (see Appendix F).	
		Install sandbags behind flood barrier in south east corner	

Time after issuance of Venue Flood Warning	Responsibility for Action	Action		
2 hrs. Facilities (this action may take 60 mins to complete) Facilities Development Manager		Facilities Development Manager in conjunction with key venue management: Arrange for relocation of cars from eastern car park Liaise with council in closing off road access Liaise with plumber in switching off sewer pumps at board (nb, sewer inlets have reflux valves). Install signage advising of closure to facilities.		
2 hrs. (this action may take 30 mins to complete)	CEO Tennis Queensland	CEO in conjunction with key venue management to arrange for specialist contractors required as part of relocation of Level 1 contents (as required), including: Electricians; Gas; IT		
3 hrs. (this action may take 24- 36 hrs. to complete)	CEO Tennis Queensland	CEO in conjunction with key venue management to start relocation of Level 1 equipment / stock / storage followed Level 2 (dep. on predicted flood level) - see Appendix G. Relocate contents to Level 3 using lifts / trolleys as appropriate. Review security arrangements. Utilise specialist contractors where required (ie, heavy gyrequipment). NB - Cleaning chemicals also stored on Level		
3 hrs	Groundsman	Groundsman to give sump pumps final check to ensure they are operational. Note: SW sump pump at rear of stadium discharges to main SW line that runs in between the show courts and the western podium which in turn runs out to the river Power supply for sump pump is fed by the western transformer		
24 hrs.	CEO Tennis Queensland	The CEO will determine need for alternative office location (ie, off site room) for the next few weeks that is able to handle 15 people Office Manager to source off-site location		
24 hrs (this action may take 4 hrs. to complete)	Office Manager	Under instruction from CEO, the Office Manager will coordinate the relocation of office equipment and supplies that will be used in the recovery off-site room. Items to be transferred include: printer fax and copy paper office laptops boxes of pens and paper back up IT server discs If Business Continuity arrangements as advised by CEO require all staff to work from home, then it is responsibility of all staff to take their own PC and associated equipment / work.		

Time after issuance of Venue Flood Warning	Responsibility for Action	Action
36 hrs. CEO Tennis (this action Queensland	If Flood Level predicted above 1:100 yr event (7.9m AHD), CEO will assign Office Manager to coordinate the relocation of all remaining office equipment (Tennis Queensland /	
may take 4 hrs. to complete)	0	National Academy) to Level 3 of venue for storage
0011101	CEO Tennis Queensland	CEO to order the venue closed for final preparation
		CEO to call the GM Operations SQ, VM QSAC, CEO Tennis Aus and notify them that the venue is closed and has activated the FERP
		Ensure all offices are locked down
36 hrs		CEO to place all contractors and equipment repair companies (as identified during pre planning) on alert
48 hrs		The CEO will assign electrician to turn off electrical power
(this action may take 15		and natural gas supply, fire systems when water is within vertical 30 cm of reaching south east corner barrier.
min. to complete)	i.	CEO to assign responsibilities to vacate and lock down the venue while allowing safe exit from the site.
		Ensure security for venue is in place

Marsh



Flood Recovery Plan

The recovery plan begins as soon as the venue is evacuated.

Whilst the venue is closed, the CEO Tennis Queensland will source a suitably sized room at a local location for use by the CEO and key managers / staff. The details of the venue's Business Continuity arrangements are in the Business Continuity Plan.

The venue will liaise with Stadiums Queensland for all property management issues.

Media management

If major structural damage is sustained which will impact on the immediate operations of the venue, a statement is to be issued once an assessment is completed. The statement will be managed by Stadiums Queensland Media Officer in consultation with Tennis Queensland.

Statements will only be issued once information is known about the full extent of damage to the venue and its impact on the venue's ongoing operations, including any announcement of when the venue will reopen.

Risk Awareness

Flood waters can cause a significant amount of damage. Venue personnel should not return to the premises until authorities (in conjunction with SQ) have advised that it is safe. Use extreme caution when entering buildings. Some common risks are listed below:

Electrocution – Stay clear of fallen power lines and electrical wires. Electric current passes easily through water. Wiring can be damaged by flood waters and presents a significant risk. Plant (eg, lifts), machinery, electrical appliances (servers, PCs) and

lights should not be used until they have been checked by an electrician. Wearing rubber gloves and rubber-soled shoes reduces the risk of electrocution.

Gas Leak – Leave the venue immediately and call the gas company if you smell leaking gas. Lanterns, torches, electrical sparks, mobile phones and cigarettes could cause an explosive fire if there is a leak. Do not turn on any light switches.

Contamination – Flood water can be contaminated with sewage or chemicals. Ensure that venue staff wear protective clothing and wash their hands and feet if they come into contact with flood waters. Food or water that has come into contact with flood waters is unsafe to eat or drink. Boil tap water if there is a chance that it has been contaminated and continue to do so until health authorities advise it is safe

Structural Damage – Watch for falling debris and the possibility of collapsing ceilings and basement walls.

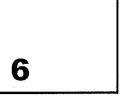
Post Flood / Clean Up

Flood waters can contain many contaminants, mud and debris. Valuable fit out, furniture and stock can be extensively damaged. A deeper flood may cause more extensive damage including damage to items such as ducts, heating and air-conditioning units, roofing, water treatment facilities, fire sprinkler systems, gas and electricity supplies and building foundations.

Once flood waters recede, the venue's priority will be to undertake the following:

Action	Responsibility / Comment						
Assess the actual damage, determine and initiate planned clean up, repair and business resumption activities. This should include assessing damage to all	Assessment to be carried out by CEO TQ in conjunction with GM Asset Management (SQ). Use specific contractors where required including Electrical, Gas, Lifts, Air Con, IT						
mechanical and electrical equipment, including gas supply, lifts, IT etc	Use a tennis facility expert to review damage to tennis courts.						
	Liaise with SQ and Tennis Australia in respect to any IT damage						
Check the flooded venue for structural stability and safety before starting clean up	Assessment to be carried out by CEO TQ in conjunction with GM Asset Management (SQ) Selected staff including Grounds Maintenance (ie, fuels stored in shed), Cleaners etc						
Clean up spilled liquids, contaminants etc.							
 Clean and dry vital equipment as impacted Ensure use of protective clothing on legs, arms, feet and hands while clearing debris Avoid using venue staff to clean up as they may not be fully trained. Hire professional 	Selected staff / contractors						
cleaning contractors and tradespeople. Remove standing water from venue	Selected staff / contractors						

Action	Responsibility / Comment Selected staff / contractors						
Dehumidify damp areas							
Check, repair and reinstate fire protection system: Test all sprinkler control valves for the open position and for physical damage. If valves are found closed, check for broken or disconnected piping before reopening Remove water and mud from valve pits Check all fire protection supervisory system circuits for integrity Test alarms systems	CEO Tennis Queensland in conjunction with GM Asset Management (SQ) and specific fire contractor/s						
Debrief all key personnel and update / modify the flood emergency response plan, as required	CEO Tennis Queensland						



Appendices

- A. Brisbane City Council Floodwise Property Report
- B. Venue Flood Level Plan
- C. Flood Checklist
- D. Record of FERP Training

 E. Key Contact List External
- F. Flood Barrier Manual
- G. Level 1 and 2 Room Inventory

Appendix A

Brisbane City Council Floodwise Property Report



BRISBANE CITY COUNCIL

FloodWise Property Report

ABN 72 002 765 795

Dedicated to a better Brisbane

Report Reference 797593

13/03/2009 11:20:23

Disclaimer

- 1.1 The flood information supplied does not represent the highest probable flood level that could occur on this property. A flood more severe than a Defined Flood can occur, although, such events are rare.
- 1.2 A property may be affected by several sources of flooding (e.g. Brisbane River, creek, waterway or storm tide). Council provides flood information on the highest known source. However no information is provided in regards to overland flow (see Terms and Definitions, p. 4).
- 1.3 If a property is affected by flooding, it may also be impacted by a Waterway Corridor. The Waterway Corridor indicates where development is controlled to preserve the capacity of the land to meet the waterway objectives. For further information contact the Development Assessment Customer Liaison Officer on 3403 8888.
- 1.4 Flooding may result from other sources including waterway tributaries and Localised Overland Flow / local runoff. Stormwater pipes may also be found on your property. For works in localised overland flow paths or to build over stormwater, the applicant must lodge an application for Building Over/Near Stormwater Facilities to Council for assessment. The location of stormwater pipes can be obtained from Council's Customer Service Centres. The applicant must engage a suitably qualified and experienced Registered Professional Engineer in Queensland (RPEQ) to undertake the appropriate assessments.
- 1.5 Any proposed filling of land must be undertaken in accordance with legal responsibilities and the requirements specified in the Brisbane City Plan 2000. Habitable floor levels are to be in accordance with the Brisbane City Plan 2000.
- 1.6 Defined Flood Levels shown on this report have been determined from the information available to Council at the date of issue. The Defined Flood Level for a particular property may change if more detailed information becomes available, or changes are made in the method of calculating flood levels. Changes in the condition of local creeks and waterways may further alter the effects of flooding.
- 1.7 The Flood Report is a guide only and should not be used or relied upon for development purposes. It is recommended that a Registered Surveyor and Engineer be engaged to undertake the appropriate development assessments.
- 1.8 For the reasons set out above, Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property Report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.

Property Details

This FloodWise Property Report provides defined flood levels from river, creek, waterway and storm tide flooding and ground levels for the property nominated below. The information contained in this report is only based on information currently available to Council and such information may not be complete. APPLICANTS MUST NOTE THE DISCLAIMER ON PAGE 1 OF THIS REPORT. This report does not provide information relating to flooding from overland flow or local runoff.

Property

Street Address 190 KING ARTHUR TCE TENNYSON QLD 4105

Lot on Plan L.7/SP.214201

Flood Level

If you are purchasing, renting, renovating, building or extending a dwelling, the following information may be applicable. Please note that in the case of ground levels Council's records may show levels prior to the development of recent subdivisions. In this instance confirmation of ground levels may need to be sought from the developer or builder.

All figures used in the calculations below are approximate only. For accurate results a Registered Professional Engineer should be consulted.

Minimum Ground Level 3.1 m AHD

based on most recent Council information*

Maximum Ground Level 13.7 m AHD

based on most recent Council information*

Highest Defined Flood Level (DFL) 7.9 m AHD (or 100 Year ARI Flood Level)

Highest flooding source from RIVER

Flooding also occurs from Not available

Approximate depth of flooding on this property 4.8 m Defined Flood Level (DFL) less the minimum ground level

Minimum habitable floor level 8.4 m AHD Highest defined flood level (DFL) in metres + 500 mm

^{*} Council receives ground level information from a number of sources including design plans, as-constructed drawings, ground surveys and airborne laser scanning. This report contains Council's most recent received ground levels. For accurate levels please see a registered surveyor.

Further Flood Level Information

If you are planning a subdivision, building a new dwelling, extending an existing dwelling, and/or other similar development, the following information may also apply:

ARI Flood Level

100 Year or Highest DFL	7.9 m AHD	Flooding from:	RIVER
	Flooding a	Iso occurs from:	Not available
50 Year	6.6 m AHD	Flooding from:	RIVER
20 Year	4.4 m AHD	Flooding from:	RIVER
5 Year	Not available	Flooding from:	Not available

Flooding Flags

The following may impact on development of your chosen site:

Large Allotment Flag

This flag is generally for subdivision and/or development sites only. This is a large allotment over 1000 square metres and flood levels may vary significantly in different areas on the site. Further investigation must be undertaken by a suitably qualified Registered Professional Engineer in order to determine a site specific flood analysis.

Waterway Corridor

This property is flagged as being wholly or partially within a waterway corridor. Further advice must be sought from a Town Planner, an Ecologist and/or a Registered Professional Engineer regarding any land use restrictions or implications relevant to this property.

Terms and Definitions

The following provides a glossary of important terms referred to within this report.

Australian Height Datum (AHD)

The national vertical/height benchmarking survey reference based on mean (average) sea level. Elevations quoted against mean sea level are normally followed with the abbreviation AHD. An AHD of 0.0 m is approximately equal to mean sea level.

Average Recurrence Interval (ARI)

The probability of experiencing a flood of a particular magnitude is expressed as an Average Recurrence Interval (ARI) in years. ARI is a statistical estimate of the average period in years between the occurrences of a flood event of a given size or greater (based on long term averages). For example, 5 Year ARI: during a five-year period, there is a chance that a flood event of this size or greater may occur at least once. The ARI gives no indication of when a flood of this size may occur next.

Defined Flood Level (DFL) The flood event adopted by a local authority for management of development. The DFL does not indicate the full extent of flood-prone land. Generally the standard used is the 100 Year ARI. The DFL is used for determining the development levels for various types of development e.g. houses, subdivisions etc. Although a property may be above the DFL it may still be affected by the flood level as a result of Council's requirement for development to be above the DFL. For further information, refer to the House Code in *Brisbane City Plan 2000*, specifically Table 1: House Flood Immunity Levels for residential property. For all other development refer to Council's *Subdivision and Development Guidelines*.

Minimum Habitable Floor Level The minimum level at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Terms and Definitions (continued)

Maximum Ground Level The highest ground level on the applicant's property based on most recent ground level information. Check with a Registered Surveyor for further information on ground levels.

Minimum Ground Level The lowest ground level on the applicant's property based on most recent ground level information. Check with a Registered Surveyor for further information on ground levels.

Overland Flow

The Stormwater runoff which exceeds the capacity of the underground drainage system (if present) and which concentrates in surface depressions, yards and gullies as it flows down a catchment. Such flooding may result from a severe thunderstorm or periods of prolonged rain. This report does not identify overland flow flood levels and associated habitable floor levels.

Waterway Corridor

The corridors defined in *Brisbane City Plan 2000*, along waterways (being a river, creek or creek tributary) which protect water flow, water quality, biodiversity, and recreation values. The potential to build or extend a home situated within a waterway corridor is restricted. For further information on this contact the Development Assessment Customer Liaison Officer on phone (07) 3403 8888.

Storm Tide

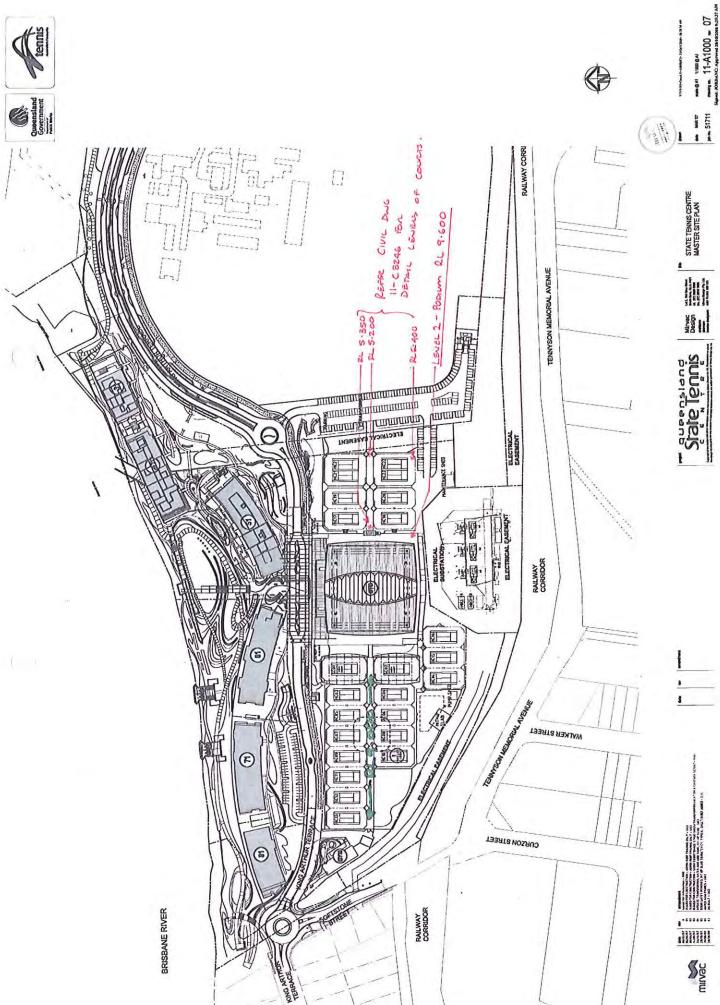
The water level which results from the rise above the normal tide level due to the combined effects of wind and atmospheric pressure caused by severe weather conditions such as tropical cyclones or storms. Such rises may lead to flooding in coastal and bayside areas of the city.

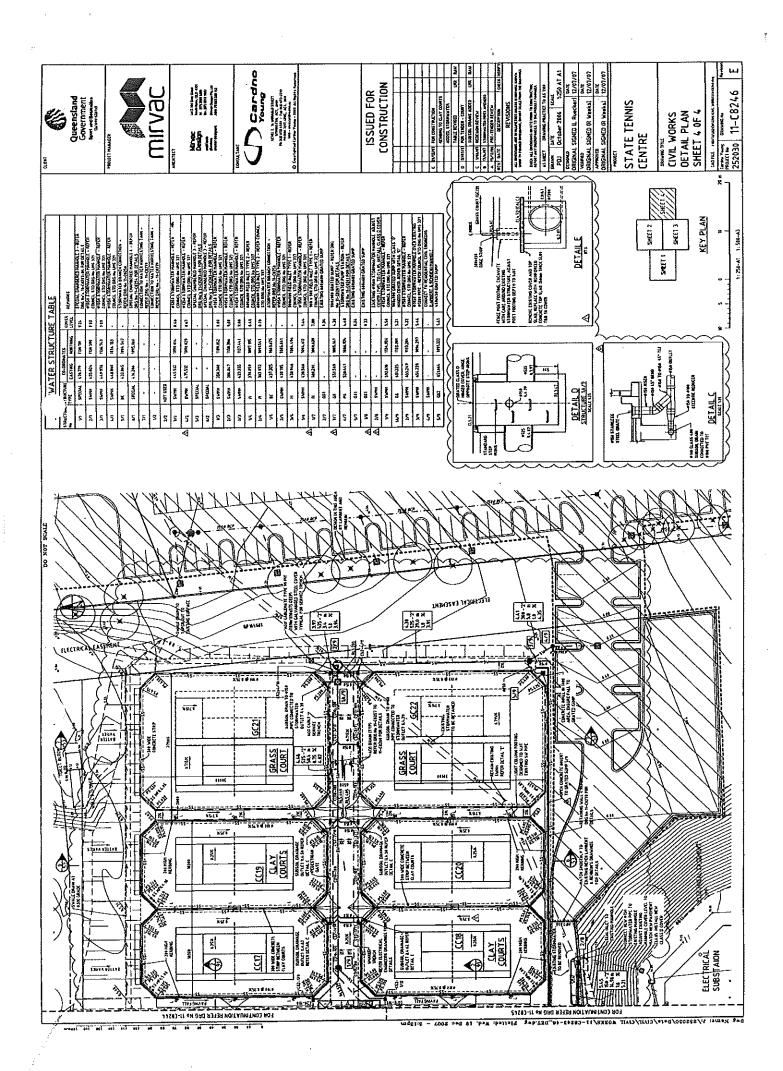
Further Information About Flooding

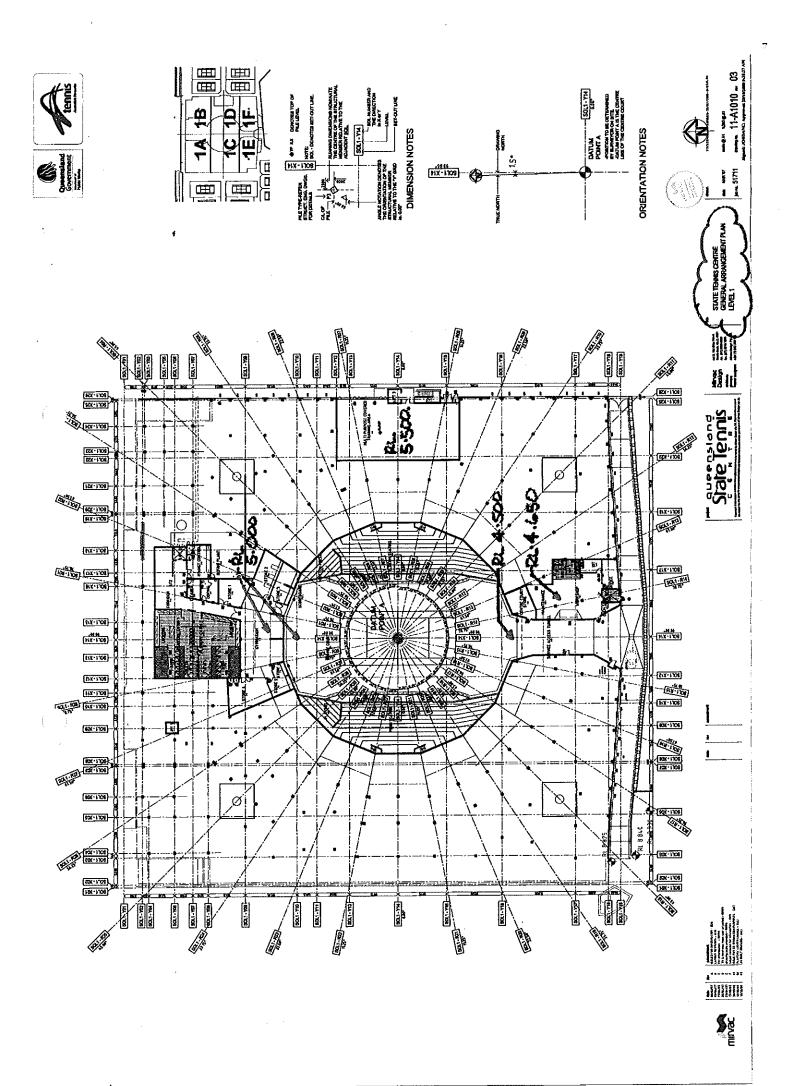
Council's Be FloodWise program has a range of publications available that provide information on flooding in Brisbane, how to prepare your home and yard to reduce the impact of flooding and flooding considerations when buying or renting, or building or renovating. This information is available from Council's regional business centres or customer service centres, by phoning Council on (07) 3403 8888, or by visiting www.brisbane.qld.gov.au/floodwise.

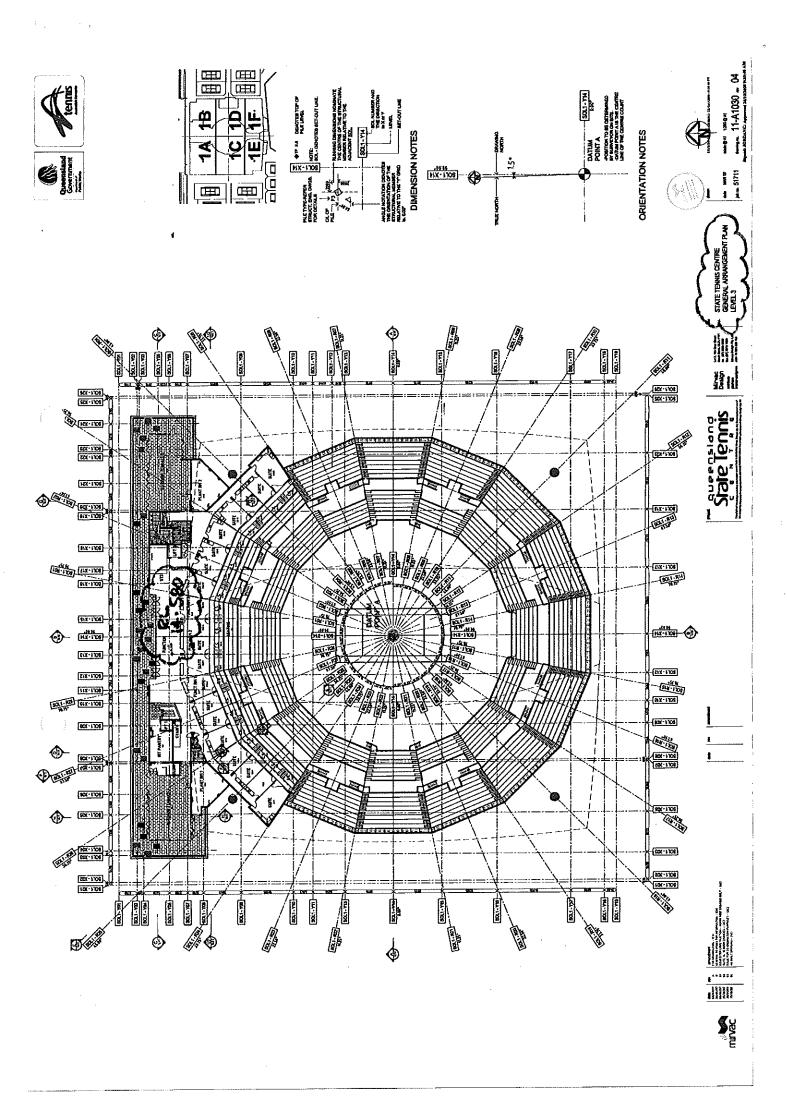
Appendix B

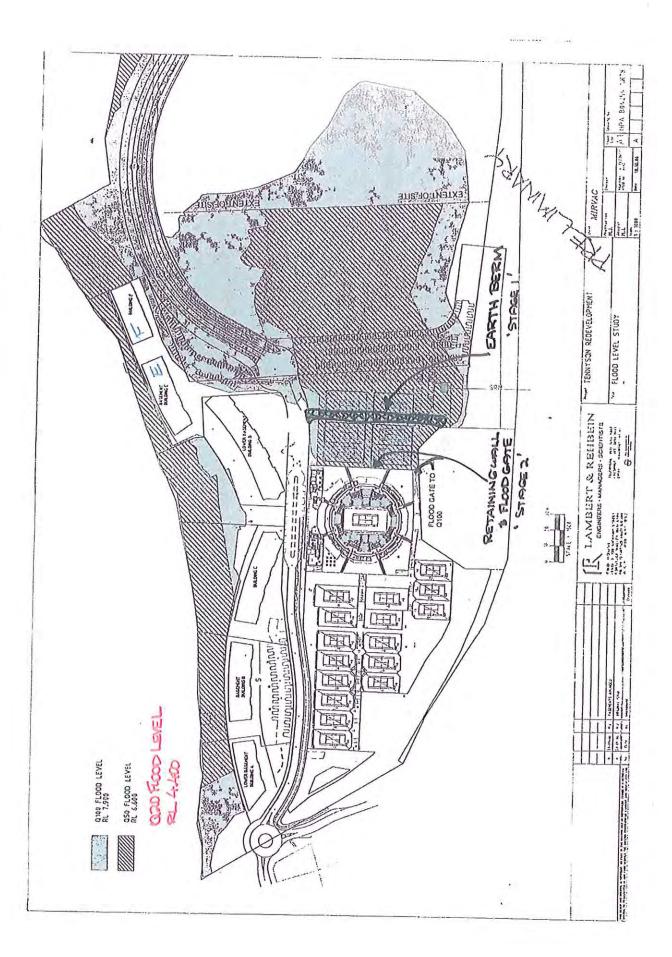
Venue Flood Level Plan

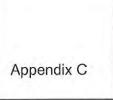












Flood Checklist

The following activities should be carried out every year in support of the FERP:

#	Action	Yes / No
1	Review the facility's flood emergency plan and update if needed. Make sure key employees / managers are included. Remind employees / managers about their roles and responsibilities	
2	Check the condition and location of flood barrier. Make sure they are accessible and ready to install	
3	Have a supply of sand mags on hand to protect possible entry points and vita protection equipment	
4	Ensure sand for sand bags is either on site or easily attainable	
5	Evaluate the need for any additional flood proofing of vital equipment	
6	Test and confirm that sump pumps are maintained	
7	Check all drains to ensure they are clear and that drainpipes are not blocked with leaves, dirt etc	
8	Update inventory list (see appendix G) and allocate responsible party for each area/room for relocating equipment in event of flood	
9	Review contact list for all contractors (incl. clean up post flood)	
10	Review all possible exposures that could affect the facility during a flood	

Appendix D

Record of FERP Training

The following table is to be used to document training undertaken by venue staff in the implementation of the venue FERP, including the implementation of the flood barrier.

DATE NEXT TRAINING:			
DATE			
SIGNATURE OF ATTENDEES:			
ATTENDEES:	(Venue Manager - QSAC) Tom Larner (CEO - TQ) (Facility Manager - TQ)		
TRAINING PROVIDED BY:	Training provided by manufacturer (Blobal)		
OVERVIEW OF TRAINING PROVIDED:	nplementation of		
DATE:	February 2009	December 2009	

Flood Emergency Response Plan

DATE NEXT TRAINING:					
SIGNATURE OF ATTENDEES:					
ATTENDEES:			X		
TRAINING PROVIDED BY:				£	
OVERVIEW OF TRAINING PROVIDED:					÷
DATE:					

Appendix E

Key Contact List - External

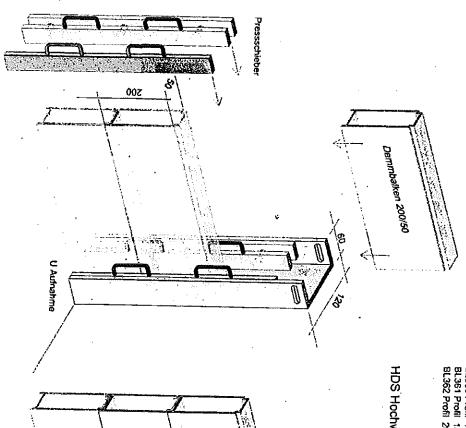
Entity	Contact	Telephone
QPS	Sherwood Police Sta	ation
QFRS		
QAS		
SES		
Brisbane City Council		
Origin (Gas and Electricity)		
Australia Security Service (ASS)		1300 735 755
Quay Clean		
Trans Pacific		
TA Legal / Mullins Legal		
Hackets DFK		
Mirvac		

Appendix F

Flood Barrier Manual



HIGHWATER DEFENCE SYSTEM



8L360 Profil 150/50 Aufnahme V2A 120-60 BL361 Profil 150/80 Aufnahme V2A 140-60 BL362 Profil 200/50 Aufnahme V2A 120-60

HDS Hochwasserschutz Dammbalken System

Dichtschieber

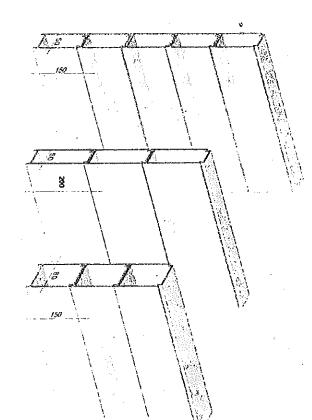
HDS - HIGHWATER DEFENCE SYSTEM

Overview

3. HDS 200/50	2. HDS 150/80	1. HDS 150/50
BL362	BL361	BL360
Page 5	Page 4	Page 3

Details

5. Vertical details	4. Horizontal details
Page 7	Page 6





3. HDS 200/50

BL 362

Highwater Defence System

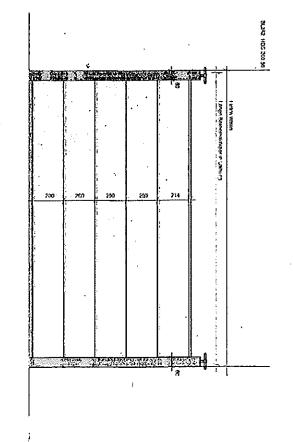
Aluminium Profile 200/50 V2A U-Mount 120/60

The HDS Barrier System was developed for optimal integration within new and old facilities. During design, special attention was given to inconspicuousness and protection from vandalism.

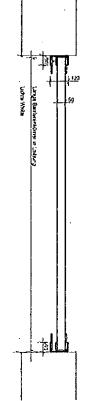
In the base version, u-posts are made from stainless steel material (304). The u-posts can be bolted directly to the wall or recessed and contain no seals, pressure rails, nuts, bolts or any other fittings which may be tampered with. The light weight barrier panels are constructed from AIMgSi0,5 aluminium making them easy to use and ensuring fast implementation.

In order to seal the barner panels against the u-posts, a unique sealing and pressure rail system has been developed. The system simply slides into the u-post and pressure is applied to fix the barner panels against the sealing rail. The design of the system allows sealing in either direction depending on flood mitigation requirements.

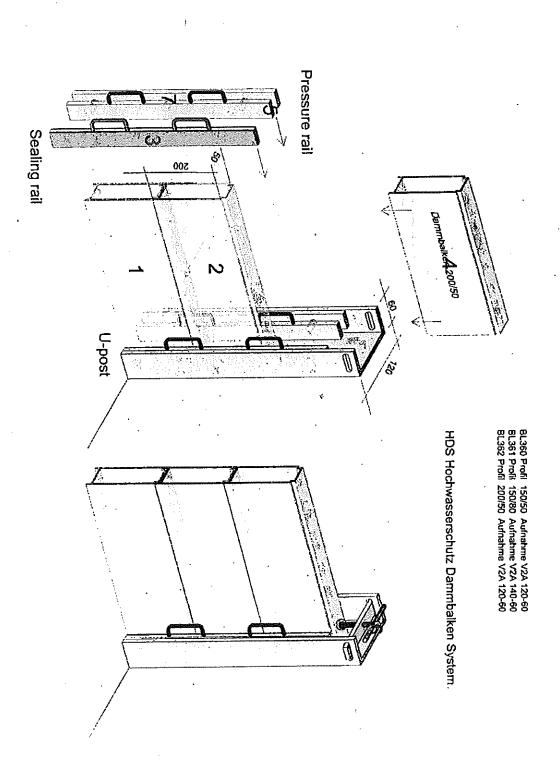
The lowest barrier segment is fitted with a special, highly flexible and durable seal. Ground unevenness of up to 20mm can be accommodated with ease. System specific pressure screws are used to apply downward force and made from stainless steel. Remaining barrier panels are fitted with a seal based on EPDM.



5



HDS 200/50	
Installation within the opening (IL)	Barrier body length LBi = LW - 60mm
Installation in front of the opening (aL)	Barrier body length LBa ≃ LW + 100mm



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SETUP INSTRUCTIONS

Assembling and closing

- 1. Slide in the first barrier profile. (1) The profile is fitted with a black compressible foam, approx. 50x50mm
- 2. Slide in the second barrier profile. (2) Any of the remaining barrier profiles can be used
- 3. Implement the sealing rail. (3) The sealing rail needs to be placed opposite the water site
- 4. Depending on height, slide in the remaining barrier profiles (4)
- 5. Implement the pressure rail. (5)
- 6. Implement pressure screw (6) Compress the lowest barrier seal up to 10-20% of its original size
- 7. Compress sealing rail through the extension of the pressure rail (7). There are three extension screws. Spanner size 19 will be needed. Apply reasonable force. System should display a tight fit.

Dissemble and removal

- Undo downward pressure screw (6) and remove
- 2. Undo pressure rail (7) and remove
- 3. Remove sealing rail (3)
- 4. Remove barrier profiles (1-4)
- After a flood event, thoroughly rinse, hose down and clean the barrier system

Notes:

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An Overview of our Barriers

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Retention width in mm

Static requirements are easily checked with the littlested graph and BLOBEL underlines the high standard and safety of its



Planning, Installation and Service

Spare Parts

are also available. parts such as seals. Spare parts for all older designs nance can therefore be limited primarily to wearing nature. The stocking of spare parts for routine mainte-BLOBEL products are known for their highly robust

watehouse or with short notice lines. Spare parts are conveniently available from the sbecial parts can also be integrated in existing product Our products are coordinated with one another, so

delivery.

with legal requirements. guarantee your system will comply in all aspects Our consultation, planning and design services

 Site analysis and assessment Our engineering consultation services include:

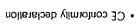
- · Development of strategies for securing private
- Quality assurance and monitoring and commercial assets
- Delivery and installation by our professionals

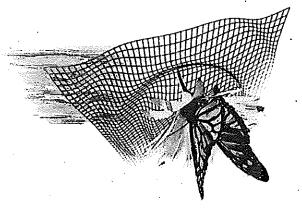
is an integral part of our service.

each installation. You will receive all of the necessary certification after

Conformity with local building specifications.

- · Table of resistance for the seals • Test certificates if required





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http://www.blobel.de eb.ledold@lism:lism-3 Fax: +61 (0)2 9369 3504 Phone: +61 (0) 2 9369 3504

Your service representative



Level 1 and 2 Room Inventory

The following provides a summary of the rooms on Levels 1 and 2 with either a significant amount of stock or high valued assets that should be relocated in the event of a flood warning. The table includes reference to the entity responsible for coordinating the relocation of room content.

Level 1 - Summary

Room / Area	Contents / Notes	Responsible Party for relocating Contents of Room
Level 1 (Internal Area	s)	
Cleaner's Rooms	Used by contract cleaners as storage room for cleaning equipment	TQ
National Academy storage area	Used by National Academy as storage room for equipment	National Academy
Male and Female changing rooms	Some lockers used by National Academy pupils to store clothes / equipment (short and long term)	TQ
Doping room	Used as storage for National Academy	National Academy
Store Room 1	Used to store removable walls for Level 2 temporary suites	TQ
Main Gym Area	Significant equipment includes: Free weights 2 x Treadmills Lat pull down machines 2 x Bikes 1 x Erg	TQ
Store Room 2 (off Main Gym Area)	Used for storage by Brisbane International event's team	BI
Store Room 3 (off Main Gym Area)	Used as a classroom (2 x PC, Physio bench), or Broadcasting area (during events)	National Academy

Room / Area	Contents Notes	Responsible Party for relocating Contents of Room	
Store Room 4	Used as a Broadcast Room (nothing currently	TQ	
(off Main Gym Area)	stored in room)	TQ	
Store Room 5 (off Main Gym Area)	Used as a Scoreboard PC room (during event)		
Store Room 6 (off Main Gym Area)	Gym storage room (eg, cardio equipment)	TQ	
Level 1 - Centre Court			
Court Side	2 x Electronic Scoreboards	TQ	
	Umpire Chair		
	Tennis nets and posts		
Level 1 - Maintenance V			
Main Maintenance Area	Significant equipment includes:	TQ	
Wall Maintonance / wea	 2 x mower tractors 	155	
	Hand mowers		
Workshop Kitchen	Strimmers Fridge	TQ	
Workshop Ritorien		13	
Workshop Office	Units Significant equipment includes:	TQ	
Workshop Office	PC and box	100	
	Fax		
(Access to) Under croft	 Server Unit Storage of Flood Prevention Barriers 	TQ	
Chemical Storage Room		TQ	
(nb, bunded room	 Storage cabinets (fire proof) for chemicals, fuels 	100	
draining into pit)	 Shelving unit for small quantities of 		
	chemicals/fertilizers		
Level 1 - Eastern Courts	s and surrounding areas (eg, car park)		
Tennis Courts	Tennis nets / posts, umpire chairs etc	TQ	
Multi Purpose Room	Empty at time of visit	TBC	
Access to Lift	De-energise / lock out in flood situation	TQ	
(nb, Access to Level 2	A STATE OF THE STA		
only)			
Maintenance Shed	Significant equipment includes:	TQ	
	1 x Roller (on loan)		
	 Tennis court maintenance equipment (eg, 		
	grass cutters, clay fines equipment, etc)		
Storage Container	Used by Brisbane International events team to store event signage	BI	

Level 2 - Summary

Room / Area	Contents / Notes	Responsible Party for relocating Contents of Room	
Level 2 (East)			
Security Room	 CCTV PCs & Monitors 	TQ	
	 Control of all access systems 		
Server Room	 Sound / PA system 	TQ	
	 Servers 		
Medical Room	■ Treatment bed	TQ	
	 Medical supplies 		
	Fridge		
Electrical Room	 PABX equipment 	TQ	
National Academy Coa	ching offices		
Meeting Room	Conference table	Nat Acad	
	■ Fridge		
	 Coffee Machine 		
National Academy	Significant equipment includes:	Nat Acad	
Offices	■ 2 x PCs		
	2 x Laptops		
	Filing		
Café / Pro Shop (incl	 Fixtures and fittings (ie, kitchen eqpt) 	UQ (Venue	
Store Room at back of	 owned by SQ 	Manager)	
Pro Shop)	Pro Shop		
	 stock owned by University of Qld 		
	 Venue Manager's Office 		
V .	 2 x PCs, printer, filing etc 		
	 Kitchen 		
	4 x fridges		
	 fat fryers & ovens 		
	microwave	9	
	 dishwasher 		
	freezer		
	stock in cold rooms (nb , EPS)		
	cleaning equipment		
10.00	(nb Lift access to Level 3 kitchen)		
Level 2 (West)	Head by HO Coast Coast Coast Coast	110	
Store Room	Used by UQ Sport Coaching UQ - sub contracted to run Court Hire, Pro Shop,		
	Café)		
Tournament Office	Used for event management of small tennis	UQ	
Johnson of the State of the Sta	tournaments		
	Occupied by UQ Head Coach for remainder of		
	time - Limited storage of chairs and BBQ		

Room / Area	Contents / Notes	Responsible Party for relocating Contents of Room	
Cleaning Cupboard	Used for storage of cleaning equipment, including high pressure hose	TQ	

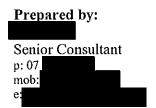
MARSH



Marsh Pty Ltd ABN 86 004 651 512 Riverside Centre 123 Eagle Street BRISBANE OLD 4000 GPO Box 2743 BRISBANE QLD 4001 61 7 3115 4555

Underwriting Report

Stadiums Queensland Tennyson Tennis Centre



Client Contact Details

Contact:		
Postal Address:		Level 11, Gabba Towers, 411 Vulture St, Wooloongabba, Qld, 4102
Telephone:		(07)
Mobile:		
Facsimile:	•	(07) 3008 6161
Email:		

Risk Details

Risk Name:	Queensland Tennis Centre	
Risk Description:	Sports Stadium	
Risk Location:	190 King Arthur Terrace, Tennyson, QLD 4105, Australia	
Site Contacts:	Operations Manager, Stadiums Queensland	
	Tom Larner, Chief Executive Officer, Tennis Queensland	

Marsh Pty Ltd has been appointed to assist underwriters in their evaluation of the risk. It is the responsibility of the underwriter to ascertain whether any further information regarding the risk is required. The material contained in this underwriting report is based upon information believed to be reliable, however no representation or warranty expressed or implied as to accuracy or completeness is made and no responsibility is accepted for incidental, consequential or special damages arising out of the use of all or part of the information.

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1. Objectives, Methodology & Limitations

The aim of this document is to provide current and potential underwriters with a general description of the risk in question. The document provides a general description of operations where appropriate and then endeavours to provide general information on known or identified risk areas, relevant to property and liability insurance. The document is written to provide the reader with a general understanding only and not a highly detailed description or analysis.

This underwriting report has been produced with information gathered from site inspections and interviews with site personnel. The detail of information gathered was limited by what time could reasonably be spent.

Estimations, approximations and qualitative terms/assessments are given and used to provide indicative descriptions only and should only be used as guides. Generally, subjective comments on the adequacy of protection, controls, conditions, etc are avoided. Rather, factual information is provided to enable a reader, experienced in property insurance risk evaluation, to form their own opinions. This document may contain language and terminology specific to the insurance industry which could be misinterpreted by readers not experienced in property insurance risk evaluation.

Marsh Risk Consulting (A division of Marsh Pty Ltd) has been appointed to assist underwriters in their evaluation of the risk. It is the responsibility of the underwriter to ascertain whether any further information regarding the risk is required. The material contained in this underwriting report is based upon information believed to be reliable, however no representation or warranty expressed or implied as to accuracy or completeness is made and no responsibility is accepted for incidental, consequential or special damages arising out of the use of all or part of the information.

2. Operations

Queensland Tennis Centre is a 5,500 seat, world class state-of-the-art sports venue with a capacity for local and international tennis events, an additional seating capacity of approximately 2000 is provided around the two show courts on the Western side during major events, this seating is not normally present. The stadium opened in December 2008 after a major redevelopment of the local area and is owned by Stadiums Queensland. The venue holds major international tennis events such as the Brisbane International, but acts as a community tennis centre between events.

The stadium is consists of continuous three tiered grandstand around a rectangular tennis court, with grass, clay and artificial surface courts surrounding the main court.

The stadium contains a café, sports equipment shop, offices for Tennis Queensland, Tennis Australia and the Brisbane International tennis tournament and corporate suites.

Access to the venue is by vehicle and public transport. Tennyson Train station is located approximately 200m from the venue.

Tennis Queensland manage the stadium from their offices located on King Arthur Terrace on the Northern side of the main stadium and are required to carry their own public liability insurance of Au\$25M. University of Queensland staff manage the daily operations of the facility and the hiring of the Western Courts (artificial surface). The national tennis academy for children aged between 11 and 17 utilises the venue and uses the grass and clay courts on the Eastern side of the venue.



Photograph 1. View of the stadium from the Eastern Side over looking the clay and grass courts. In the back ground are residential construction works

3. Changes Since the Last Survey

This is the initial survey of the facility, as such there have been no changes of note.

4. Construction and Occupancy





Photograph 2. Western End of the main grandstand

Photograph 3. Centre Court area



Photograph 4. Roof section of the centre court structure



Photograph 5. Western courts



Photograph 6. Eastern Courts



Photograph 7. Centre court

Table 1: Construction and Occupancy of Buildings

	BUILDING DETAILS	DETAILS
BUILDING	CONSTRUCTION	OCCUPANCY
Centre Court	Floor: Reinforced pre cast concrete	Process: 5,500 seat Sports Stadium and associated outer courts
	Walls: Reinforced concrete and glass with a steel support frame work	Storage: Minimal combustibles are stored, with flammable liquids stored in metal cabinets with ventilation extraction provided.
	Roof: Steel Frame with a Teflon PTFE Canopy over Ortech S50 durra acoustic panels on two sides of the centre court area (refer photograph 4), steel frame and metal sheeting Please note that the Durra panel has Class 1 Construction Materials approval from FM Global for fire resistance.	Fire Load: Light Combustible loading Hazardous Storage: EPS cool rooms in kitchen areas
	Storeys: 3 Level 1: Main court, gym, changing rooms, multi function room and broadcasting rooms. The undercroft is at this level and houses some plant equipment Level 2: "Podium level" main public entry to the structure, Pro Shop, office entry, toilets, fire services pump room, main electrical switchroom Level 3: Corporate suites and two plant rooms	
	Age: December 2008	

Internal Fire Separation: None

The main centre court structure is built over unsealed ground, providing an undercroft arrangement. This arrangement provides access to the underside of the stadium. Access to this area is restricted and requires a key.

The centre court and exterior Western courts are built using Plexicushion materials. This material provides a water proof surface and is made from water, silica, fillers, rubber granules and latex emulsion resin and can take up to 8 days to apply correctly depending on environmental conditions. The material has been identified as non combustible / non flammable and if involved in a fire will release irritating vapours, gases and some carbon monoxide only. There is less than 2.0% of OSHA PEL 50ppm of ethylene glycol and more than 0.1% crystalline silica.



Photograph 8. Undercroft facing South East



Photograph 9. Ventilation system in the undercroft on the Eastern wall

4.1. External Building Fire Separation

Due to the separation distance and type of construction to surrounding buildings, the centre court structure is considered to be fire separated.

5. Fire Suppression

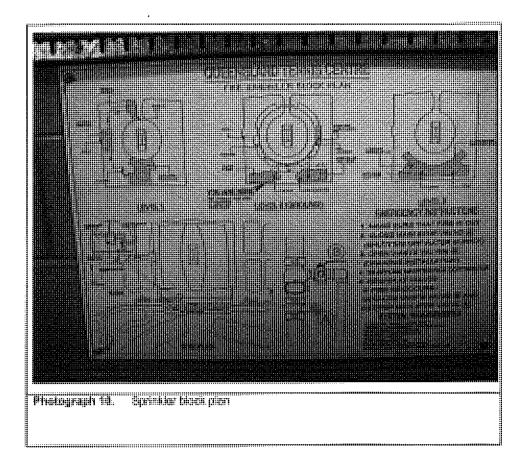
5.1. Sprinkler Protection

The centre court structure is protected by sprinklers in accordance with AS2118:1999 to OHI, with a pressure and flow requirement of 1535 l/m at 340kPA.

The highest head is located 10m above the valve set. Water is supplied via a single electric pump with a duty of 24.8l/s at 30m head (1548l/m at 300kPa). The required rpm is 2970 to meet the duty point with a 159 mm diameter impeller.

The protected areas can be seen in photograph 10.

The sprinkler system is linked directly to the local fire brigade.



5.2. Hydrants, Hose Reels and Extinguishers

Fire extinguishers and hose reels have been installed as per Australian Standard requirements. These units have been subjected to commissioning tests.

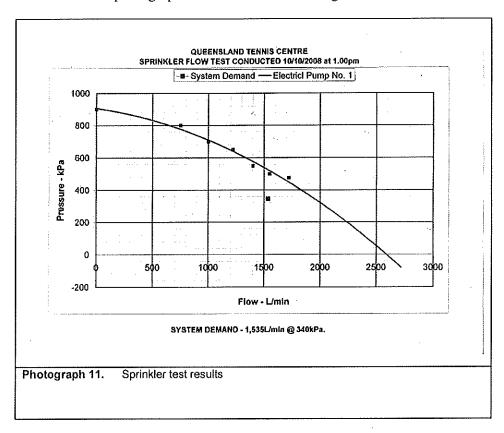
Hydrants have been provided around the venue in accordance with Australian Standards. There is a diesel pump associated with the hydrant water supply. The pump has an impeller diameter of 159 mm and is designed to cut in at a pressure of 450kPa with a duty rpm of 3000.

5.3. Water Supply

Water is supplied via two separate supplies, one for the sprinkler system (100nm diameter) and one for the hydrant system (165nm diameter).

The static pressure in the line was noted as being 560kPa at the time of the survey.

Please refer to photograph 11 for the commissioning flow test results.



5.4. Other Installed Fire Suppression Systems Nil

5.5. Fire Fighting Personnel and Mobile Equipment

Eight staff at the venue have undergone warden training. The chief warden has been designated to contact the fire brigade in case of an emergency.

Emergency evacuation procedures are in place and training has been provided.

The local fire brigade is located at Rocklea, approximately 4 kilometres away form the venue. It can be expected that it would take approximately 10 minutes to reach the venue.

6. Fire Detection, Supervision and Security

6.1. Site Occupation Details.

The venue offices are open form 8.30am to 5pm Monday to Friday, however the Pro Shop café managed by University of Queensland is open from 6.30am through to 10.30 Monday to Friday and from 7am to 7pm at weekends.

Tennis Queensland controls corporate function activities at the venue and University Of Queensland manages local school usage of the Western courts.

Local junior tennis tournaments are held on Saturday afternoons, and the courts are said to be fully booked at weekends and during week nights.

The venue is looking to hold more events such as the Davis Cup and Federation Cup events.

Tennis Queensland utilise the grass and clay courts for junior tennis academy activities.

6.2. Electronic Fire Detection Systems

Smoke detection is provided in most enclosed areas including in concealed roof spaces within the main structure.

6.3. Site Security

50 CCTV cameras are installed at various locations around the facility. The footage is recorded on the digital format and held for approximately three weeks.

The office and corporate suite areas are accessed via electronic key cards only. The outer courts are monitored by University of Queensland representatives on site and are said to be locked outside operating hours.

6.4. Other Detection Systems

Nil

Special Hazards and Significant Risk Issues 7.

7.1. Kitchens and Cooking Facilities

The main kitchen is located on the ground level at the Pro Shop, with a smaller kitchen located on the third level. The main kitchen is a fully equipped commercial kitchen and sprinkler protected is provided over the deep fat fryer and in the cool room. Both kitchens contain a commercial deep fryer installed with an exhaust system, extraction hood and a high temperature release sprinkler system.

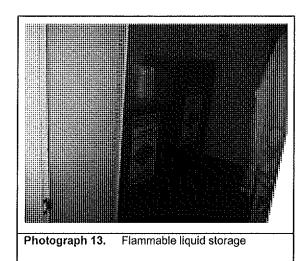
Smoke detectors are provided in the roof spaces.



Photograph 12. Kitchen area on level three

7.2. Flammable Liquids

Flammable liquids, such as petrol for the mobile equipment on site, are held in metal and plastic containers within the flammable liquids cabinets seen in photograph 13.



7.3. Fuel Oil Storage

Please refer to section 7.2 for details

7.4. Flammable Gases

Some natural gas from the town's main supply is provided to the two kitchens and to a number of small hot water units used to supply hot water to the kitchens, toilets and changing facilities. Manual shut off valves are provided on the North East side of the podium as seen in photograph 14.





Photograph 14. Incoming gas shut off supply

Photograph 15. Pro Shop kitchen facilities

7.5. Materials Handling

Materials handling procedures are in place and are currently undergoing review. Training has been provided relating to manual handling to relevant staff.

7.6. Hazardous/Toxic Materials

Some fertilisers are retained on site to aid in the management of the grass court surface. These are stored in the maintenance workshop on Level 1

7.7. Explosives

Nil.

8. Specific Public Liability Risks

8.1. Public Access and Car Parks

Access to the venue's outer tennis courts is not restricted during operating hours, but is monitored by University of Queensland. Access to the office and corporate suite areas is via electronic key access only. There is no fence surrounding the property, although fencing is provided on the Southern side to prevent access to one of Brisbane's main substations.

Outside of operating hours the courts are said to be locked and the main court is locked down, with access to the office areas further restricted by the use of shutters.

A public car park is located on the Eastern side of the venue, and a staff car park is located at the end of the public car park. Access to the staff car park is restricted.

8.2. Public Gatherings

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The venue is open to the general public, with the Western courts supervised by University of Queensland employees.

Main events such as Brisbane International tennis tournament have an additional specific event management program plan in place. The plan is reviewed annually.

During the Brisbane International, Tennis Australia hired the venue and undertook event management.

8.3. Floor Surfaces/Footpaths

The main structure has concrete pathways on the podium level

Footpaths surrounding the outer courts are generally concrete, with the playing surfaces a mixture of grass, clay and synthetic materials. Outside of these areas the surface is generally grass.

Slip testing on these surfaces has been conducted as part of the construction process via AS4663:2004 for the mean British Pendulum Number (BPN). The results noted acceptable mean BPN results in external areas (between 41 and 60 BPN), the male toilets indicated a mean valve of 23 BPN.

8.4. Stairs/Escalators/Travelators/Lifts

Three are three vertical transport locations. Only one is available to the general public. This lift is operation 24 hours a day and is located on the Eastern side of the main structure and provides disabled access from the podium level to the grass and clay courts.

The remaining two lifts are located in the office areas and provide access to all three levels. One lift on the North Western side of the main structure is primary a goods lift and the lift on the North Eastern side of the main structure provides access to the corporate suites and Brisbane International offices on level three and the multi function room, gym and changing rooms on level one.

8.5. Falling Objects

Falling objects are considered unlikely at this venue during normal operations. At present, due to the ongoing construction of a residential high rise approximately 25-30m from the venue, a crane is in operation. The main beam is not allowed to swing over the centre.

8.6. Food Sales

Food is provided through the Pro Shop café during normal operations. This is managed and operation by University of Queensland staff.

During main events, additional food outlets are provided through contracted catering services. The Pro Shop café is managed by the contracted caterer as is the kitchen supplying the corporate suites.

8.7. Sharps

Sharps containers are provided in the toilets at the venue. The contract cleaning company manage sharps disposal. Appropriate sharps collection equipment has been purchased for use at the venue.

Permanent staff from the University of Queensland are all first aid trained.

8.8. Impact With Windows

Toughened safety glass is provided in the venue and is used as barriers from level two and three to the lower tiers.

Glass used in the commentary box is also toughened safety glass.

Glass windows are also present at the podium level around the office entry points. The used of glass is clearly marked in these areas.



Photograph 16. Safety glass barriers

8.9. Crowd Control

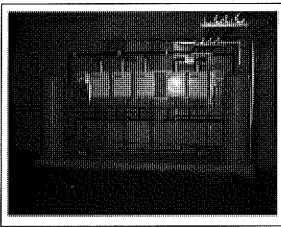
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A formal Event Management Plan has in place detailing pre- and post-event activities, which includes crowd control and emergency evacuation procedures. Additional staff are brought in to help with major events. Briefing sessions are provided pre and post event to these staff.

9. Boiler and Machinery

9.1. Steam/Hot Water Boilers

Three small packaged residential size hot water heaters are used in the facility to provide hot water to the kitchens and toilet / changing facilities. These units are located in the undercroft area.



Photograph 17. Gas supply

9.2. Air Conditioning

Air conditioning is provided by a number of small packaged units for the level 1 areas, as well as via a number of air handling units located in the undercroft and on level three (East and West ends of the Northern side). The loss of these larger units would provide some discomfort to patrons in corporate suites, but would not hinder the general public attending the event as the venue is largely open air.

These two plant rooms, house four commercial air conditioning units each. The refrigerant used is R407C.

9.3. Cooling Towers/Condensers

Nil.

9.4. Refrigeration/Freezers

There are no keg rooms on site. Two cool rooms are on site, one in each kitchen. Each cool room has internal sprinkler protection provided and is kept at approximately 3°C. The cool rooms are constructed from EPS (Expanded Polystyrene Sandwich panel).



Photograph 18. Pro Shop café cool room

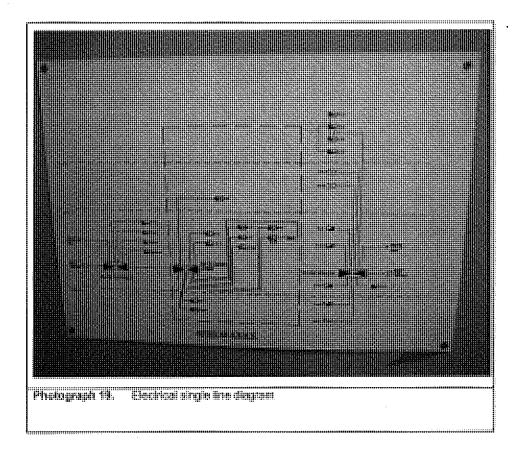
10. Management Controls and Common Hazards

10.1. Electricals

There are two electrical feed to the venue (East and West), although, one feed handles the majority of the supply requirements. Both feeds have the ability to connect to a generator and for major events, a generator is leased and connected a few days prior to the event beginning.

The feeds are via two Energex owned 1000 kVa pad transformers, which then step the power supply down for use at the venue. The main pad transformer is located on the Western side of the venue near the car park.

Smoke detection has been installed in the main switchroom.



10.2. Thermography

Thermography has not been conducted as yet, however the equipment is still under warranty and thermography is required before the warrant expires.

10.3. Preventative Maintenance

Additional groundsmen are currently being sourced to maintain the grounds. The existing grounds staff help in preparation for events as well as cleaning up after events.

There is no formalised preventative maintenance program in place as the building is still under warranty.

All buildings and grounds appear well maintained.

10.4. Smoking

Smoking is not permitted on site during normal operations. During events, designated smoking areas are provided on the outer edges of the property along cigarette receptacles.

10.5. Hot Work Permit System

Due to the age of the building, hot work has not been conduct as part of maintenance activities. It was said that this will be reviewed once the warranty period has expired.

10.6. Housekeeping

Housekeeping was observed to be good during the survey. There is a formalised cleaning contract in place, which includes daily cleaning of the venue as well as additional cleaning activities for events.

10.7. Self Inspection Procedures

Nil.

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10.8. Contractor Management

This is currently managed through Mirvac (venue builder) as part of the warranty period. All warranty work has top be reported to Tennis Queensland prior to commencing and is reviewed after completion to ensure work is carried out.

This includes work conducted in confined spaces.

10.9. Emergency Planning

Emergency evacuation procedures are in place for normal operations and for event activities. Training in these procedures has been provided by First 5 Minutes, and external contractor.

11. Exposure Risks

The site is exposed by the following:

North: Residential construction works and the Brisbane River

South: Main electrical substation and rail line

East: Department of Primary Industry research farm. This is currently under a tender process for redevelopment to commercial and residential activities.

West: Mirvac gym building for associated residential development properties and

rail line.

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Photograph 20. Google Earth image of property prior to construction of venue

Residential construction

Tennis Centre

Electrical substation

12. Supplemental Risks

12.1. Windstorm

The location of the venue is subject to wind speeds as defined by AS1170.2:2002 for Region B.

Wind studies were undertaken by Windtech Consultants Pty Ltd to determine the structural load effects of the venue design for an event with 1 in 1000 year return period prior to construction on behalf of Stadiums Queensland. This was completed by the construction of a 1:300 scale model and a wind tunnel study. Wind tunnel testing was used to determine the design actions resulting from the above regional wind speed. The approach satisfied the requirements of AS1170.0 Structural Design Actions General Principles – Appendix A/B – Special Studies.

Further information can be sought through Marsh Brisbane broking office.

12.2. Flood and Water Damage

In general, the venue has been constructed above the 1 in 100 year flood level of 7.9m AHD.

The driveway access in the South East corner at the rear of the property is below the 1:100 flood level. This drive way leads directly to the maintenance workshop and centre court areas. The podium level is at 9.6metres AHD, which is the same level as the driveway access on the South West corner.

In order to mitigate the 1:100 year flood level exposure a flood gate system has been installed. This provides a locked in flood barrier to a height of approximately 8.6 metres AHD (to the locking slot on the barrier). As can be seen in photographs 20-22 below.

This barrier is fixed to the edge of the stadium wall and the adjoining retaining wall. The walls have been designed to with stand hydrostatic pressures equivalent

to a water level of 8.25m AHD, which is the same height as the ventilation grills for the undercroft.

In this area are ventilation grates for the undercroft, these extend below the height of the barrier, measurements from the roadway and from the podium level indicate that the ventilation grates are located at approximately 8.25m AHD.

Training has been provided to four on site staff members and one off site staff member. Additional training will be undertaken once the additional maintenance staff have been recruited. Two people are required to install the barrier, although only one would require training to position the barrier correctly. It was stated that the barrier would take approximately 30 minutes to install correctly.

Flood maps and associated flood barrier information have been included in the appendices of this report.





Photograph 21. South East corner driveway from an Eastern orientation

Photograph 22. Driveway view from the Western orientation



Photograph 23. Barrier system, located in the undercroft behind the maintenance workshop

Sump pumps have been provided for level 1, with channels and piping provided to remove water from the centre court area.

12.3. Vandalism and Malicious Damage

An event management plan is in place involving additional staff. All members are appropriately trained.

No significant past problems or losses reported. No unusual risks noted.

12.4. Aircraft

The site does not lie below any commercial flight path approaching or leaving the Brisbane Airport. No significant past problems or losses reported. No unusual risks noted.

12.5. Impact Damage

The venue is sufficient separated from traffic to consider that there are no unusual risks noted.

12.6. Earthquake and Volcano

According to Australian Geological Organization, the best estimate for maximum ground movement that could occur sometime in the next 500 yrs at this site is 0.05-0.10g (acceleration coefficient), with a 10% chance of this happening in the next 50 yrs. The risk due to earthquake/volcano is considered low.

12.7. Collapse

Due to the age of the building, the risk of loss due to structural collapse is considered low.

12.8. Subsidence

The venue has been constructed on top of an old power station location after the land underwent approved remediation process requirements.

In the event of a I in 100 year flood event the earth may be subjected to water logging. To mitigate subsidence occurring, the foundations consist of precast concrete piles driven in to rock and / or bored piles to refusal / rock.

12.9. Lightning Protection

Nil

12.10. Theft

Tickets for major events are sold through a third party. The Pro Shop sells items related to tennis clothing and equipment as well as food and is considered a low risk.

13. Business Interruption

13.1. External Risks

This site requires power, water, gas, road access, public access and waste disposal to operate. The site is located in the suburbs of Brisbane and as such the reliability of these utilities is expected to be high. No unusual risks noted.

A backup generator is hired for major events.

13.2. Internal Risks

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Critical internal processes include lighting and power supply. As mentioned above a back-up generator is hired for major events and would operate stadium lighting in the event of a mains power outage. Air conditioning is not critical for the site to function.

The venue contains a number of function rooms, and two kitchens in the event that one of these were lost, functions and catering operations could be carried out in other rooms onsite. Loss of any of these rooms is not considered critical and would not result in any interruption to business.

A loss of part of the canopy section may lead to the general public to be concerned / discouraged from attending. This in turn may lead to a reduction in expected attendances for events. However, to help mitigate this risk, the roof structure has been design for a 1 in 1000 year event.

14. Loss Experience

During the recent Brisbane International tennis event, the Eastern pad transformer failed across one phase. This reduced the centre court to 10% power for approximately three hours. The event continued during this time and was rectified through the use of the stand by generator. This occurred during the day and there was sufficient light to continue playing on centre court.

Our investigations indicate no other significant damage type losses through fire, impact, water damage, etc. However this should not be considered a definitive investigation and further information should be collected from the Marsh Brisbane broking office if required. This does not include public liability considerations.

15. Loss Expectancies

15.1. Maximum Foreseeable Loss (MFL)

The MFL is defined as the maximum loss in respect of material damage which could be sustained if all private and public protection equipment, systems and organisations are assumed to be inoperative. The estimate does not take into account such coincidences and catastrophes which may be possible, but remain unlikely.

As such it is expected that the flood mitigation equipment does not work as intended and flooding of centre court and associated undercroft areas occurs. If this occurred just prior to or during a major event such as Brisbane International Tennis tournament, revenue from event takings if the event has to be moved may be affected.

Damage to the centre court and undercroft areas can be expected to occur. The main pad transformer is also located in the affected area. Whilst power can be supplied if required from a generator, it will still need to be connected through the transformer.

It is not expected that any lives will be put in danger as a result of the event, due to Bureau of Meteorology warnings of the impending natural hazard.

The flood water can be expected to damage to centre court surface as well as the clay and grass court surfaces on the West side of the venue. There are a number of air handling units in the undercroft as well as power distribution boards. These units can be expected to be flood damaged.

The changing rooms and commentary positions will also be flood damaged. The main structure can be expected to be withstand the event as a result of the

foundations and construction. Therefore only the fitout of these areas would be expected to be affected.

The estimated damage would be for the contents at the exposed levels, as such it is estimated that approximately 40% of the contents and machinery would incur some damage. This would not include the centre court area.

The centre court playing surface and associated lower grandstand levels would be affected. As the chairs in the grandstand are of plastic construction, no damage is expected unless debris enters this area. The centre court may be affected with the playing surface lifting of affected in other ways which may require it to be relayed.

The relaying can be expected to take up to 9 days depending on environmental conditions, in addition to the remove of the existing surface. The use of grinders and other dust creating equipment would need to be minimised or eliminated due to the carcinogenic nature of the plexicushion dust (crystalline silica), which would cause some delays in the removal of the surface. This is estimated to be an additional 4 days.

The plant and equipment affected by the flood water appears to be of standard size and capacity, therefore enabling the easy replacement of damaged components. Outside of the utility supply (power, water and sewage) the venue can be operated effectively during normal operations. Major event operation would require the plant and equipment to be in place for the comfort and safety of players and patrons alike.

A flood loss prior to the event may cause the event to be moved, this may incur a loss in revenue for venue. This is estimated to be approximately 70% of the venues annual revenue at this point in time. However, this may need to be reviewed in conjunction with existing contractual arrangements.

15.2. Normal Loss Expectancy (NLE)

The NLE is the maximum loss as defined previously, but it allows for physical protection and human response. It therefore represents a more realistic estimate of loss resulting from a single incident.

As the clay and grass courts on the Eastern side of the venue are covered by the 1 in 50 year flood level, the normal loss expectancy scenario for this venue is expected to be a flood event involving this area.

The cost of these courts was approximately Au\$333,000 to install. If the inert base layer survives, it is estimated that it will take approximately 15 weeks for the grass courts to be ready and approximately 6 weeks for the clay courts to be ready for use.

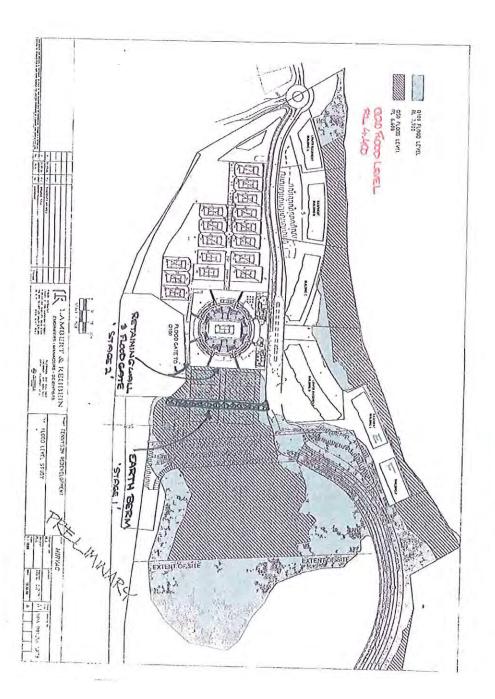
It is unlikely that significant loss in revenue will be experienced as a result of this type of event as these courts are used by the sports academy. This use can be transferred to the all weather plexicushion courts on the Western side of the venue.

Electrical supply to the venue could also be expected to be affected one of the two pad transformers are located in this area.

16. Appendices

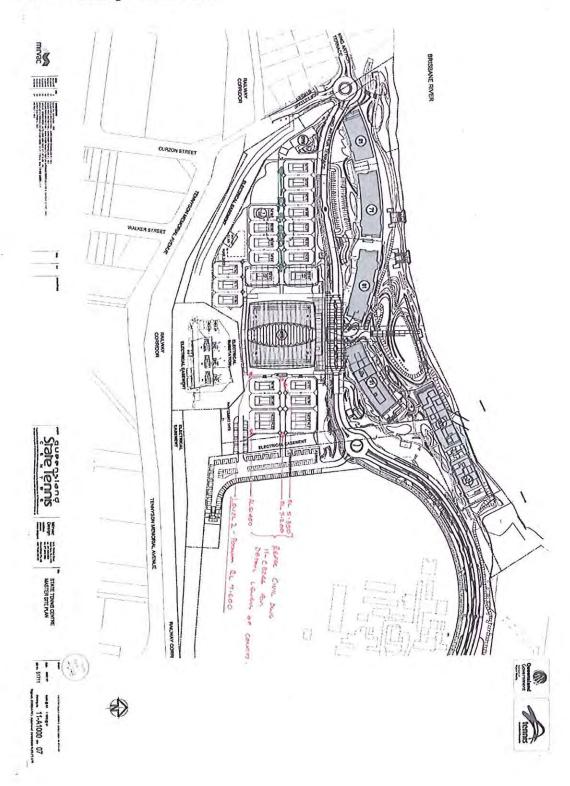
- 16.1 Flood map
- 16.2 Building flood levels
- 16.3 Barrier Information

16.1 Flood Map



Carter Cart - 4-5 ?

16.2 Building Flood levels



16.3 Barrier information

FLOOD BARRIER SYSTEMS

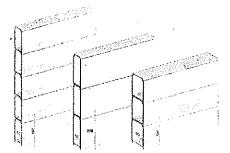
HDS - HIGHWATER DEFENCE SYSTEM

Overview

1. HDS 150/50	BL360	Page 3
2. HDS 150/80	BL361	Page 4
3. HDS 200/50	BL362	Page 5

Details

4. Horizontal details 5. Vertical details Page 6 Page 7



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LOOD BARRIER SYSTEMS



3. HDS 200/50

BL 362

Highwater Defence System

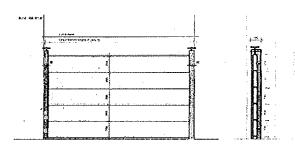
Aluminium Profile 200/50 V2A U-Mount 120/60

The HDS Barrier System was developed for optimal integration within new and old facilities. During design, special attention was given to inconspicuousness and protection from vandalism.

In the base varion, u-posts are made from stainless steel material (304). The u-posts can be boiled directly to the wat or recessed and contain no seets, pressure raits, nuts, bots or any other fittings which may be tampered with. The logid weight barrier penels are constructed from Allego's, a surremman making them easy to use and ensuring fast ling ementation.

In order to seal the barrier pane's against the u-posts, a unique sealing and pressure rail system has been developed. The system simply sides into the u-post and pressure is applied to fix the barrier pane's against the sealing rail. The design of the system allows sealing in either direction depending on food mitigation requirements.

The lowest barrier segment is fitted with a special, highly feoble and durable seal. Ground unevenness of up to 20mm can be accommodated with ease. Bystem specific pressure screws are used to apply downward force and made from stainless steel. Remaining barrier panels are fitted with a seal based on EPDM.





HOS 200/52	
Installation within the opening (4.)	Barrier body length LBI = LW - 60mm
Installation in front of the opening (al.)	Barrier body length LBa = LW + 100mm

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FLOOD BARRIER SYSTEMS ..



SETUP INSTRUCTIONS

Assembling and closing

- 1. Slide in the first barrier profile. (1) The profile is fitted with a black compressible foam, approx. 50x50mm
- 2. Slide in the second barrier profile. (2) Any of the remaining barrier profiles can be used
- 3. implement the sealing rail. (3) The sealing rail needs to be placed opposite the water site
- 4. Depending on height, slide in the remaining barrier profiles (4)
- 5. Implement the pressure rail. (5)
- 6. Implement pressure screw (6) Compress the lowest barrier seal up to 10-20% of its original size.
- 7. Compress sealing rail through the extension of the pressure rail (7). There are three extension screws. Spanner size 19 will be needed. Apply reasonable force. System should display a light fit.

Dissemble and removal

- 1. Undo downward pressure screw (6) and remove
- 2. Undo pressure rail (7) and remove
- 3. Remove sealing rail (3)
- 4. Remove barrier profiles (1-4)
- 5. After a flood event, thoroughly rinse, hose down and clean the barrier system

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Paga 7

16.1.1.1.1 Underwriter Feedback

Marsh endeavours to provide the highest quality underwriting reports. In order to achieve this, it is important for us to obtain feedback from underwriters. As such, it would be appreciated if you would help us by completing our short questionnaire.

You can provide this feedback by calling the author directly, by e-mail or by fax (contact details are provided on the front of this report).

Was any required information not included in the report? Was there any unnecessary information included in the report?	
Was there any way the information could be presented/communicated more effectively and efficiently? – eg pictures, figures, more concisely, more easily understood format, etc.	

Thank you for providing us with feedback. Your comments are of great value and greatly appreciated.

MARSH

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If this communication contains personal information we expect you to treat that information in accordance with the Australian Privacy Act 1988 (Cth) or equivalent. You must advise us if you cannot compty.

