Introduction

This outline Brief may be used as a starting point for the group designated to advise consultants on the design of new athletics facilities. The facility envisaged here is a major facility with an extensive grandstand. However, it can be adapted for lesser facilities.

The Athletics Australia Facilities & Equipment Committee is available to advise on matters of detail.

BRIEF FOR

ATHLETIC STADIUM

1.0 GENERAL

1.1 Objectives

The stadium shall meet the requirements of World Athletics (WA) as defined in the current editions of the WA Competition and Technical Rules and the WA Track and Field Facilities Manual.

The competition areas shall be suitable for the conduct of Athletics Australia Track and Field Championships and Grand Prix events, as well association, Little Athletics, Masters and schools' championships, and other athletic meetings of various sizes.

In addition, the facility shall be suitable for training with access controlled by either key card or similar means when the ground is unattended.

The covered grandstand shall seat XXXX with supplementary seating located on adjacent grassed banks to seat at least XXXX spectators with permanent sun protection sails over. The total ground capacity shall be XXXX spectators.

1.2 Standards

Australian Standards shall be used for this project where not overridden by WA requirements. The Consultant shall recommend which Standards are appropriate and where options are allowed which option(s) are to be taken.

In addition, the consultant shall check and certify that the Building Code of Australia standards have been met.

If any brief requirement conflicts with the Australian Standards, local authority and/or BCA requirements, the consultant is to bring the matter to the attention of the client for resolution.

1.3 Building Operation and Maintenance Manual

The tender documentation shall specify that the Contractor is to provide two copies of a comprehensive building operation and maintenance manual before practical completion is granted.

The manual shall be produced in a loose-leaf format with sufficient drawings provided to fully define all aspects of the project, and a drawing index. The "as-installed" drawings provided shall include:

- one full size set of transparencies suitable for producing useable prints;
- two full size sets of prints;
- two sets of A3 prints, bound and indexed;
- one set of Autocad DWG drawings on CD disc and
- one set of 35mm black and white microfilms (positive) mounted on standard aperture cards for all drawings not available on Autocad. These drawings should also be scanned on to the CD disc in a PDF format.

The tender documents shall clearly indicate the contractor's and sub-contractor's responsibilities for providing expeditiously all the above necessary documentation for the building in the required format. All printed material included in the manual shall be original printed material or legible copies with the particular items of equipment included clearly identified.

1.4 Relationships

Spectators, officials and athletes must be able to move directly from the parking areas to the entrance gate.

The layout of the stand, its various rooms must meet the functional requirements for the various types and levels of competition.

Athletes must be able to move from the arena and/or the stand to the throwing and grassed running warm-up areas outside the athletic track and back again to the arena for competition.

1.5 Entrances and Exits

The main entrance is to be the main entry point for all users. The entrance shall be adjacent to permanent parking and evident to casual visitors.

There shall be a gatehouse with space for two gatekeepers behind counters with a three-part sliding full glass windows above the counters to a height of at least 2 metres on the two long sides. This will allow the gatehouse to be used either on one side by two gatekeepers or on two sides by one gatekeeper on each side. The single width door into the gatehouse shall be from the arena side.

There shall be provision for disabled person access.

Truck access shall be provided to the arena, the equipment store and the rear of the grandstand.

Access onto the arena shall be able to be controlled by providing appropriate fencing and limiting entrances/exits from the grandstand onto the arena.

Appropriate signage shall be provided at the entrance to direct visitors, athletes/officials and spectators to their respective areas of the grandstand.

There shall be at least 3 one-way turnstile exits. The number of turnstiles exits and their locations shall be confirmed when the facility layout is finalised.

1.6 Signage

A system of signage is required at the main entrance that directs competitors, spectators and out of competition time visitors to the various entries to offices, changerooms, VIP Room and seating.

Within the stand individual rooms shall have slide in signs denoting their usage. Signs shall be provided for the prime usage as defined in this Brief.

Seat numbering is not required in the grandstand.

1.7 Spectator Fence

A galvanised mild steel pipe post and rail with galvanised mesh in-fill fence 900mm high shall be erected between the spectator areas and the arena to prevent movement of spectators onto the arena. The style and composition of the fencing shall be recommended by the consultants taking into account first cost, aesthetics, design life and maintenance costs.

Pedestrian gates are to be provided opposite exits from the grandstand to the arena if there is a pedestrian walkway in front of the grandstand. Otherwise the fencing shall abut the grandstand.

Double gates are to be provided opposite the vehicle entry(s).

1.8 Security Fence

The entire athletics facility shall be fenced with a security fence at least 1.8m high and topped with 3 strands of barbed wire. The bottom of the fence shall be set into concrete to prevent unauthorised access. The fence shall be rabbit and other feral animal proof. Security gates of the same height and construction as the fence shall be provided at vehicular and personnel access points.

1.9 Ticketing

The main means of gaining entry will be by paying cash at the gate. However, ticketing may be provided for major events for which there may be complimentary tickets for athletes/officials/VIP/media.

In addition, there should be a gate which can be operated by a silicon chip card or magnetic strip card similar to allow individual people to access the arena for training when the gate is not staffed.

Ready access must also be available to the Athletics offices at all times.

1.10 Attendance

The range of attendance at various events is shown in the table hereunder.

Event	Length Days	Spectators	Officials/ Volunteers	Athletes	VIPs	Media
Australian Championships	4	1000	200	800	50	50
Grand Prix	0.5	10,000	150	180	50	50
State Championships	2	500	150	400	30	5
School	2	4000	100	750-850	20	3
Little Athletics	2	4000	100	1000	40	2

There will be a range in the number of competitors and officials at club and association weekly competitions.

1.11 Functional Diagrams

Refer to Figure 1

2.0 ARENA

2.1 Orientation

Orientation of a track should always take into account the prevailing winds and sun angles.

In the majority of athletic events athletes favour a following wind. However, in sprints, sprint hurdles and the horizontal jumps the maximum allowable following wind is 2 metres per second for record and qualifying purposes. However, the stand and the main sprint track should be on the generally western side of the arena.

2.2 Wind Protection

The design of the new facilities should be such that maximum wind protection is provided for the new track by keeping as many trees as possible, digging the arena into the ground and using the excavated material to form continuous earth banks used as spectator seating and wind protection. There should be no gaps between the stand and earth banking. Any access points to the arena through the stand or banking should be wind protected to prevent channeled wind reaching the arena. This may require openings to be protected by steel gates that can act as complete wind barriers.

2.3 Competition Facilities for Track Events

The competition area for track events shall consist of a 400 m oval track of X lanes, front straight of X lanes and a back straight of X lanes for events up to and including 110 m hurdles, with a starting assembly area of 3 m minimum length and a finish on area of 20 m minimum length. The oval track shall have a standard 36.5 m radius to the kerb. Refer to the WA Manual.

The steeplechase track with a permanent water jump shall be located on the inside/outside of the second bend of the oval track.

2.4 Infield

The gradients on the grassed arena will be 1% or less in a turtle back configuration.

Consider providing nylon mesh reinforcing in the arena surface soil.

2.5 Competition Facilities for Field Events

The facilities listed below are the minimum required but it may necessary to consider providing additional facilities where timetabling of Little Athletics and Masters major competitions require additional facilities to allow simultaneous competitions some of which would not require the same length of runways and landing areas as for international competition.

2.6 Competition Facilities for Jumping Events

The facilities for jumping events shall consist of:

- Two sets of parallel LJ/TJ runways with landing areas at both ends shall be provided such that one long jump and one triple jump can be conducted simultaneously in either direction

depending on the wind conditions in front of the grandstand. The runway length for the triple jump shall be 45 m. Each runway shall have a long jump take-off board at one end and triple jump boards at 9m, 11m &13m at the other end. In addition, take-offs shall be painted at 5m & 7m.

- A pole vault runway with a minimum 45 m runway length in two directions, a central landing area and two vaulting pole plant boxes in front of the grandstand and/or one/two runways on one "D" with planter boxes at each end.

- Two high jump facilities at opposite ends of the infield. Run up lengths to high jump upright positions, without the need to remove the running rail, shall each have a 20 m minimum radius.

The requirements are illustrated in the WA Manual.

2.7 Competition Facilities for Throwing Events

The competition facilities for throwing facilities shall consist of:

- One discus circle with a protective cage in the corner of the arena near the 200m start with an 80 m radius 34.92 degree landing sector with a gate on installed on the track side of the standard discus cage so as to prevent implements landing on the back straight.

- One combined hammer and discus concentric circle with a protective cage in the corner of the arena near the 1500m start with a 90 m radius 34.92 degree landing sector. This is the preferred location for discus competitions.

- Two shot put circle set adjoining the generally northern corners of the arena each with a stop board and a 25 m radius 34.92 degree landing sector. The circles should be located so as not to interfere with the start of the sprint events. A supplementary shot put circle shall be located on the outside of the track inside the arena.

- Two javelin runways each 36.5 m long located at opposite ends of the arena with landing sectors 100 m long and 50 m chords. Consider marking training throwing arcs adjoining the competition runway so as to protect the competition runway from excessive wear.

Refer to the WA Handbook and Manual for details.

2.8 Warm-up Facilities

One each hammer and discus concentric throwing circles within a single protective cage, a javelin runway and a shot put circle is required outside the arena to allow throwers to warm-up safely before their events. The throwing facilities would also be used for training to preserve the stadium in-field surface in good condition.

If there is insufficient space available to allow the implements to land normally then it may be possible to provide a facility such as is provided in indoor training facilities where the implements are caught by netting. Some possible arrangements are shown in Figures 8.6.6 a to d of the Manual.

Provide a security fence 1.8m high around the warm-up facilities and sand pits filled with fine plasterer's sand to prevent the scoring of implements within the landing areas at the points of greatest concentration of implement landings 5m to 15m from the centre of the shot put circle and 20m to 50m from the centre of the hammer circle.

Level grassed areas are required to allow sprinters and various other track athletes to warm up adjacent to the arena.

2.9 Track and Runway Measurements, Levels and Gradients

The competition areas for track and field facilities shall have the maximum gradients and measurements as laid down in the WA Manual.

The contractor shall arrange for a licensed surveyor to undertake a survey of all the facilities as constructed completing the WA Measurement Report proforma.

The contractor shall install permanent measurement marks as recommended in the WA Manual.

3.0 ATHLETIC TRACK MARKINGS

3.1 General

All track markings shall comply with the WA Rules and the WA Track and Field Facilities Manual particularly in terms of location, size and colour.

3.2 Start Lines

Start lines are required for the following events:

50 m
60 m
70 m
80 m
90 m
100 m
110 m
200 m
400 m
800 m
1500 m where there is a sprint track on the back straight the start line is to be extended
3000/5000 m with group starts lanes 5 to 9
10000 m with group starts lanes 5 to 9 with the start lines extended to the extent of the synthetic
1 Mile
3000 m steeplechase
2000 m steeplechase
4 x 400 m relay

3.3 Finish Lines

In addition to the finish line it is optional to have additional dashed lines at 1metre interval back towards the start. The finish line to be marked to meet photo-finish requirements

3.4 Relay Zones

The relay marks for each changeover zone shall be provided for the 4 x 100 m, 4 x 200 m and 4 x 400 m relays. The 4 x 200 m relay shall be run in lanes for one lap plus the next bend so that runners can start running out of their lanes after the 800m breakline..

The start and end of take-over zone markings for events like 4 x 1500 m relays not run in lanes and the later parts of 4 x 400 m, and 4 x 800 m relays shall be provided.

3.5 Hurdle Markings

In addition to the 100 m, 110 m and 400 m hurdles, and steeplechase individual hurdle positions the following hurdle positions shall be marked in the colour designated:

60 m	brown
80 m	black
90 m	white
200 m	purple

3.6 Other Track Markings

Breakline for 800 m
Break mark at lane 5 for 3000/5000 m group starts
Assembly line 3 m behind 110 m start
Lane numbering at starts and finish

3.7 Field Markings

The runways of the long jump, triple jump, pole vault and javelin are to be delineated by white lines 50 mm wide. The javelin throwing arc is to be 70 mm wide and extended at the extremities for 750 mm perpendicular to the runway.

The centres of the throwing circles and the javelin throwing arc are to be permanently marked in the circle surface.

A zero line is to be painted 10 mm wide from the back of the pole vault box at right angles to the runway and extended to the outer edge of the uprights.

Where the throwing circles are set in a synthetic surface or concrete the sector lines are to be marked on the synthetic as are the 50 mm wide white lines 750 mm long on either side of the circle. The rear of the white line shall form a prolongation of a theoretical line through the centre of the circle at right angles to the centre line of the landing sector.

3.8 Permanent Marks

Engraved metal markers shall be fixed to the inside of the kerb with an abbreviated description of each track marking.

In addition, there shall be metal markers on the kerb and runways respectively to show the position of the wind gauges for the sprints, the long jump and triple jumps.

3.9 Long Jump and Triple Jump Facilities

3.9.1 Take-off Boards

The take-off boards for the long jumps shall be located 2 m from the respective landing areas and at 13 m, 11 m and 9 m from the respective areas for the triple jumps.

The take-off boards shall be a proprietary make constructed of durable timber, white rubber or similar material with an aluminium or galvanised steel tray built into the runway to take the board. The take-off boards shall be double sided and be provided with a slot to take the plasticine indicator board or a blank board.

The take-off boards shall be easy to remove and replace during competition, and dimensionally accurate so that the boards can be interchanged.

Take-off board blanks consisting of aluminium or galvanised steel frame covered with polyurethane synthetic material to match the runway shall be provided for every take-off board position so that the take-off boards can be removed and stored when there is no competition. To provide training opportunity one take-off board blank at each end on each runway shall have a white take-off board painted on the blank surface for both long and triple jump.

3.9.2 Landing Areas

The landing areas shall be centrally placed in respect to the runways serving them and at least 8 m long. Separate landing areas shall be provided for each runway and the landing areas shall be be 1 metre apart.

The landing area shall be well drained and connected to the drainage system. The sand shall be non abrasive and meet the WA grading specification. The surround to the landing area on the three sides away from the runway shall have a system to allow sand spilt from the landing area to be collected. Attachments shall be provided to allow tarpaulins to be anchored over the landing areas when the areas are not in use to prevent sand being blown from the areas.

3.9.3 Pole Vault Facilities

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There shall be permanent level platforms on which the landing areas rest and the pole vault upright base frames are fixed. The details of the pole vault upright frame fixing will be required for the attachment of all upright frames into the supporting surface.

Infill blocks constructed of track PU/rubber material shall be provided for each pole vault box.

The pole vault plant boxes shall meet the WA dimension requirements.

3.10 Discus and Hammer Facilities

3.10.1 Protective Cages

A proprietary in situ protective cage that meets the WA performance specification shall protect each throwing facility. Note that proprietary cages are not equal many of the cages have a low wind speed

rating which require the netting to be lowered after each competition. If the netting is to be left in place then a cage with the appropriate wind speed rating must be supplied.

In the case of a combined discus and hammer circle the cage shall meet the higher requirements for hammer. Any separate discus circle shall be located in front of the hammer circle.

The cage shall be so located that there is sufficient space for a throwing judge to stand between the cage and the track without likely to be hit by an implement which causes the net to move outwards.

The desirable properties of the cage are:

- The cage meets the dimension requirements of the WA Rules;
- The netting cord must be strong enough so that it does not break under the impact of the hammer, abrade where it is attached or deteriorate unduly under the effects of ultra violet ray exposure;
- the net can be quickly raised and lowered;
- There is positive attachment of the netting at ground level that maintains the net in correct relationship to the throwing circle(s);
- The gate pivot posts should not be exposed so that an implement causing damage to both can hit it;
- The netting shall be hung clear of the support posts so that a thrown implement does not strike the posts;
- The gates shall be easy to open and close manually with a positive positioning arrangement in the fully open and closed positions;
- The gates shall maintain their integrity under long term usage; and
- The supporting frame shall be stiff enough so that it does not deflect out of position unduly under the weight of the net and the force of wind.

The netting shall be provided with tell-tales as required by the WA Rules.

3.10.2 Throwing circles generally

All throwing circles shall be of permanent construction and provided with permanent drainage connections.

The circles steel rim hoops shall be provided with a number of braces to prevent the hoop being distorted out of circular during transport and installation.

All throwing circles shall be provided with permanent fixing points for throwing chair tie down. Ten evenly spaced stainless steel ferrules shall be set into the concrete surround to the circles at a radius of 3.5 metres. Matching stainless steel eyebolts shall be provided for attaching the chair hold down straps

3.11 Javelin Throwing Facilities

The synthetic surface shall be extended at least 1000 mm beyond the throwing arc so that if an athlete fouls, he does not injure himself because of a change of surface.

3.12 Equipment

The cost of the facilities shall include a Prime Cost amount for the supply and delivery of the following competition equipment. The list below is in priority order.

- Photo-finish equipment
- Hammer cage
- Discus cage
- Electric carts (2 No.) and trolleys (4 No.)
- Wind gauges (3 No.)
- Steeplechase hurdles
- Measuring tapes - fibreglass and steel
- Electronic Distance Measuring (EDM) equipment
- Throwing implements - hammers, discii, shot puts and javelins
- Starting blocks with false start provision
- Hand trolleys
- Track and distance indicators

4.0 CONSTRUCTION OF THE TRACK AND RUNWAYS

4.1 Generally

The synthetic surface shall meet the performance specifications laid down in the WA Manual.

The contractor shall provide samples of the material to be used for evaluation and samples of the actual material as laid shall be taken during construction for testing by a WA approved laboratory to prove that the material meets the performance specification.

The nominal thickness of the synthetic surface shall be the absolute thickness as shown in the WA Product Certificate for the product used but the thickness may still need to be greater than that so that the track surface will meet the WA Performance Specifications particularly in respect of Shock Absorption. However, there shall be an increased thickness as recommended in the IAAF Manual at the end of runways and in the steeplechase water jump as follows:

20 mm thick last 3 m high jump, last 8 m javelin, last 8 m pole vault last 9m triple jump

25 mm thick in steeplechase water jump

The measurement of track thickness, drainage, surface flatness, colour and imperfections compliance shall be in accordance with the WA Manual procedures.

4.2 Foundation

The track is to be designed for a design life of 50 years during which time the track will be resurfaced a number of times.

There should be a geotechnical report for the site from which the thickness and composition of the gravel sub-base and base courses, and bitumen base and wearing courses can be determined.

4.3 Surface Drainage

The surface drainage system shall be designed to remove surface water quickly from the track, infield and outfield, and structures to the existing stormwater drainage system in the area.

The drain between the track and the infield shall be fed by slits behind the track kerb in the top of the drain cover.

Allowance shall be made for collecting water from the throwing circles, pole vault pole boxes, steeplechase water jump and horizontal jump landing areas.

4.4 Sub Surface Drainage

The extent of sub surface drainage shall be determined by the characteristics of the existing ground and the form of construction used for the track and the grassed in-field.

4.5 Watering System

The grassed areas on the inside and outside of the track shall be watered by an automatic pop-up watering system controlled by programmable timing system.

Design the automatic irrigation system in accordance with the Water Supply Authority Guidelines.

4.6 Broadcast and Automatic Officiating Equipment Provision

Electrical power, telephone, data, distance measuring connections, television, electronic timing is required for major meetings.

Cables for power, telephone and electronic timing shall be permanently installed to four in-ground pits located in the four corners of the arena with other pits on the outside of the track just past the finish line and on the inside of the track 50m before the finish line for a wind gauge connection. In addition, there shall be spare cable ducts not less than 225 mm diameter installed under the track to and between each of these pits with draw wires to allow temporary cables especially TV cables to be quickly and easily drawn through for particular events.

Figures 5.2.4a and 5.2.4c in the WA Manual indicate the range of equipment to be allowed for.

There should be four 240 volt 10 amp waterproof single phase power outlets in each pit.

In view of the very damp conditions in the pits the cabling and its connections should be of the highest possible standard of waterproofing.

5.0 ARENA USERS

5.1 Competition Management and Technical Officials

During an athletic meeting there are concurrently usually one track event and several field events. The number of field events which can be conducted concurrently depend on the number of field event facilities and ensuring safety. At top level competition only one long throw can be conducted at any one time.

Consequently, there needs to be a large number of technical officials to conduct the events with up to ten officials for each field event. When photo-finish timing is used the number of timekeepers and places judges may be reduced.

The entire competition is controlled by the Competition Director who ensures that the events are conducted on time and the results are disseminated to the competitors, the spectators and the media.

The Competition Director must be situated in an elevated position with a clear view of the finish line and the entire arena including any scoreboard. The Competition Director is located in a soundproof air-conditioned room together with at least two assistants. In addition, the Competition Director would have at least two assistants on the arena in radio communication with him.

The Announcers' Room should adjoin the Competition Director's Room. This room also should be soundproof and air conditioned with a full view of the arena.

The above two rooms should have 100 mm tube between them to allow written material to be passed between them. The two rooms should have a bench running the full length of the long side facing the arena.

Whilst the photo-finish cameras are located at an angle between 25 and 30 degrees above and in line with the finish line. The cameras should be located in a secure room in the stand either as part of the main structure or as a separate elevated room in the stand. There should be appropriate access to allow easy fixing and alignment of the camera before each meeting (see illustration of such an installation at Manual Figure 8.4.2.2 except that the angle of inclination should be 30°).

Immediately behind the Competition Director's Room is the Administration Room where heats and finals listings are compiled. This work could be done manually however for major meetings this work should be computerised. The seedings are placed on the notice board for the information of the athletes and the public, and copied to key officials and the media.

In the administration area results are compiled and copied after verification by the Competition Director and public announcement.

The administration area and Jury Room can be located on a lower level to Competition Management if necessary.

The Technical Officials and assistants report before the start of competition to the Officials Manager to receive their instructions from the Event Referees and Chief Judges. The officials march out as a group to their event site in good time to receive the athletes and manage the athletes' warm-up before the event scheduled start time.

A large amount of relatively heavy equipment is required to conduct athletics. This equipment should be moved on trailers pulled by suitable electric vehicles from the equipment room to the event sites. The equipment room should be at arena level. A suitable location for the equipment room should be built into the bank past the near the 1500m start. The equipment room should be divided into a number of separately secured areas:

- Little Athletics general equipment $100m^2$
- General users/training equipment $100m^2$

- Grand Prix competition equipment 100m^2
- Club competition equipment 100 m^2.

Separate storage space should be provided with separate entrances for:

- Jumps landing mats 100m2
- Vaulting pole 30m^2
- Facility maintenance equipment 60m^2.

5.2 Athletes

At championships and Grand Prix, after warming up the athletes report before their event to Pre-Event Control (Call Room) to have their entry, shoes and their uniform checked for conformity with the rules. From the Pre-event Control the athletes are escorted to their event site. The field event scoring sheet is carried by the escorting official to the appropriate field event site and handed to the Chief Judge.

At the conclusion of all championship and Grand Prix events the athletes pass through the Post Event Control which is located just past the finish line. Here the track athletes pick up their tracksuits and other gear that has been brought in baskets by athlete's services assistants from the start. Field event athletes carry their own gear from the event site.

Athletes who have to go to drug testing after presentations are notified of their responsibility to report for drug testing within one hour. Placegetters are escorted to the medal presentation area to await the ceremony. The remaining athletes disperse either to the stand or to report for another event.

Athletes usually arrive at the ground in their tracksuits and not many athletes will shower and change after their competition at the ground.

5.3 Media

The Australian Open Championships and Grand Prix is normally televised by a combination of fixed cameras and hand-held cameras. A camera in a cherry picker at the end of the sprint track provides head on shots, a camera on a platform in the stand near the finish line gives shots of the finish and the circular event starts. Other temporary platforms may also be used.

The television coverage is backed up by at least one outside broadcast van parked as close as possible to the back of the stand. From here temporary cabling is run to each camera position including cameras adjacent to field event sites.

Just past the finish line the media will conduct spot interviews with the athletes after they have finished their events and before they move into the Post Events Control.

The preferred location for print media when not at the spot interview position is opposite the finish line or nearby. Two benches each 10 metres long with sufficient width to take a portable computer and space behind for chairs for each reporter/commentator should be provided at the back of the stand, one above the other, opposite the finish line.

5.4 Spectators

The total grandstand accommodation should be XXXX persons including VIP, handicapped and media. Any overflow spectators should be accommodated on earth mounds around the arena. For track events the preferred location if not in the stand is past the finish line on the first bend particularly when the high jump is conducted at that end. Other field events attract coaches and interested spectators as close as possible to the particular events.

There should be no physical separation between the stand and the banked spectator viewing areas.

It is desirable to minimise the distance from the spectator viewing areas to the arena within the constraints of the athletic field event competition requirements. Spectators should have a clear view of each event site. .

5.5 VIP Area

The VIP Area should be located at the rear of the stand with full height viewing windows. It should be provided with a small bar area and a single toilet opening off the room. VIPs have to be able to access the track for presentations either by an internal staircase or by a stair directly from the stand to the arena level.

It is assumed that there will be external catering for food and drink.

The consultant should separately cost the provision.

5.6 Public Address System

A public address system is required to provide whole of stadium cover to allow competition instructions and results to be transmitted as well as safety control messages and music. There should be good speech intelligibility and music quality transmission.

Roving microphones are required to allow messages to be broadcast anywhere on the stadium.

High performance loudspeakers should be located so as to provide optimum perception by spectators and competitors.

The system is to be controlled by the Announcer from a sound control console that allows the Announcer to select optimum tone and volume settings for each sound source. Individual sections of the stand should have separate systems so that only those parts of the stand occupied by spectators need to be activated.

There should be an AM/FM receiver, cassette deck and compact disc player incorporated.

A security override is required and the public address is to be incorporated with the Emergency Warning and Intercom System.

5.8 Grandstand

The Consultant is to determine the height at which the grandstand is to be raised above the arena level, the slope of the stand and seating arrangement taking into account sightlines and access to the arena requirements. One alternative is to allow spectator access in front of the grandstand with stairs rising up from this walkway instead of from the rear of the grandstand.

The sightlines to the arena, especially the finish line and the future scoreboard should be checked using standard anthropometrical data of spectators seated with a standard seated height of 1,340mm with an assumed sightline clearance of 120mm.

The focal point for sightlines shall be the inside lane of the track if there are no field event facilities between the track and the stand.

The Consultant is to recommend an appropriate type of seating to be used that allows easy cleaning under seats. Cantilevered type preferred by users.

The width of aisles and walkways should meet the requirements of relevant Australian Codes or Standards.

The roof should cover at least 75% of the seating with wind-blown rain at an intruding angle of 70^0 to the horizontal.

5.9 Fire Resistance

All external walls of the grandstand undercroft shall be masonry, concrete or composite construction complying with BCA requirements.

The consultant shall provide a report on how the open spectator stand and the undercroft areas will comply with the BCA for fire resistance and egress. Specific details of horizontal and vertical fire separation of specific hazard areas from non-fire rated spaces should be addressed in the report.

The aim is to determine a low-cost solution for meeting the intent of the BCA requirements.

5.10 Handicapped Access

Handicapped access to BCA, AS 1482 and other authority requirements shall be provided to a disabled spectator seating area in the stand as well as to other first floor areas such as the Competition Management area and the VIP Room.

Athlete with a disability access shall be provided to all arena level rooms in the grandstand and to the arena. The design of the various athletic facilities shall meet the requirements of athletes with a disability, e.g. hold down points for throwing events.

5.11 Facility Security System

The track facility shall have a perimeter and building structure security system suitable for connection to a security service company.

6.0 SCHEDULE OF ACCOMMODATION

6.1 Athletics

Competition Management

Competition Director's Room	$15m^2$
Announcers' Room	$10m^2$
Photo finish Room	$15m^2$
Jury	$15m^2$
Competition Administration	$40m^2$

Competitor Services

Pre-event Control (Call) Room	$50m^2$
Competitors' Changerooms (2 off)	$80m^2$ (each)
Post Event Control	$50m^2$
Drug Test Rooms	$35m^2$
Physiotherapy Room	$30m^2$
Presentation Holding	$20m^2$

Officials' Services

Officials Change	30m^2
Officials Report-in and Administration	200m^2
Technical Equipment Stores (2 x 15m2)	30m^2
VIPs	
Viewing Area	60m^2
Public Facilities	
Café	40m^2
First Aid	20m^2
Public Toilets (male and female)	60m^2
Plant Room/OB Van	25m^2
Maintenance	
Cleaners' Room	4m^2
Bulk Equipment Storage	590m^2
Ground staff (Refer Note 3)	100m^2
Gate Ticket Office	8m^2
Athletics Offices	
General Office	40m^2
Reception/Display area	35m^2
Little Athletics Office	30m^2
Tea Room	10m^2
Store Room	15m^2
Meeting Room	20m^2

Notes:

1. The need for a ground's staff rooms is dependent on the management plan for the facility.

7.0 STRUCTURAL ENGINEERING

7.1 Site Investigations

The Consultant should have the necessary geotechnical and topographical surveys of the site undertaken and base the designs for the facility on the results of those surveys.

7.2 Structure

Comply with Australian codes and BCA requirement. The design must ensure that long term movements in the structural elements do not cause cracking of subsidiary elements or loading of elements not designed to carry loads.

A copy of the structural calculations is to be provided to the Client.

7.3 Masonry

The masonry design is to allow for expected expansion/shrinkage during its life by appropriate crack control joints.

The quality of all masonry is to meet the appropriate Australian standard for the class of work being undertaken.

8.0 MECHANICAL SERVICES

8.1 Hot Water

The most economic form of water heating shall be determined on a life cycle costing basis. It is assumed that there will be a number of local water heaters rather than a central hot water service or it being combined with the grandstand room heating system. The energy source used will be determined from the most favourable tariff.

8.2 Ventilation

Mechanical exhaust ventilation shall be provided from the kitchens, showers and toilets. Adequate allowance shall be made for the size of any duct required to handle the volume of air required.

The Consultant shall advise whether mechanical ventilation will be required to supplement natural ventilation for rooms without external windows.

8.3 Heating

The consultant is to provide costed options for the heating system based on life cycle costing.

The heating system chosen should allow individual rooms to be heated and maintained at 21^0 C when the other rooms are not occupied.

The form of heating generally might be either electricity or gas fuel individual room heaters thermostatically controlled.

Separate heating of those rooms with heat pump air conditioning will not be required.

8.4 Air Conditioning

Air conditioning is to be provided in the Competition Director's Room, Announcer's Room, Photo-finish Room and the Athletics Offices to maintain 24°C in summer and 21°C in winter.

The consultant is to advise whether individual heat pumps supplying each of these rooms or groupings of these rooms is practicable.

The entire system shall be designed so that there is no undue noise transmitted or generated which will impact on the occupants of the building or the surrounding residential area.

The mechanical engineering sub-consultant shall report on the comfort conditions in those rooms not listed to be air-conditioned.

8.5 Fire Services

Fire hose reels shall be provided to meet BCA requirements and those of the Fire and Emergency Services Authority.

The requirements of the Fire Brigade shall be met in the provision of grandstand internal and external fire hydrant services.

8.6 Hot and Cold Water

All hot and cold water piping shall preferably be hard drawn copper; capillary fittings with brazed or silver soldering may be used nut not lead solder reservoir type fittings. Alternative materials may be considered if it can be shown to be cost effective practice and meets the requirements of the relevant Australian codes.

All exposed piping shall be nickel chrome plated. There should be stop valves to isolate sections of the system and all water closets.

All hot water and chilled water piping where necessary shall be lagged to meet Australian standards for local climatic conditions.

Hose bib cocks shall be provided to allow the changerooms, toilets, stand, equipment rooms and concourse to be washed down with hoses.

Drinking water bubblers shall be provided for spectators and on the arena past the finish and at 100m intervals around the track and in the Post Event Control.

8.7 Stormwater

The stormwater drainage system including gutters and downpipes shall be designed for the 1 in 100 years rainfall intensities determined for the storm duration appropriate for the collection time at the particular location. Inground pipework shall be designed for 1 in 20 year rainfall intensities with appropriate surcharge structures where downpipe meet underground pipework.

Pits shall be provided at changes of direction; surface drainage pits shall be fitted with cast-iron grates and frames. Deep pits shall be provided with galvanised steel rungs cast into the concrete wall.

Internal box gutters shall not be permitted in the design. Roofs of less than 15 degree pitch over offices shall be of single sheet unit construction to the apex or where curved entirely of single sheet units.

8.8 Sewer Drainage

The design shall comply with the requirements of the local authority , and the drainage shall be by gravity to the area sewer main.

The main sewer lines and branches shall be designed to cater for a maximum spectator load of XXXX persons.

The main sewer lines shall be provided with inspection pits at all changes of direction and all minor lines shall be fitted with clean out points.

Deep pits shall be provided with galvanised steel rungs cast into the pit wall.

A grease arrester pit shall be provided externally to the café before the café drainage joins the sewer proper. The grease arrestor shall be provided with an access cover and a connection point for tanker pump out.

Sanitary stacks and vents shall be located in accessible ducts to allow maintenance and any additional connections in the future.

9.0 ELECTRICAL SERVICES

9.1 Switchboard

The power supply to the stadium shall be metered externally to meet local power authority requirements. The Consultant shall determine whether a high voltage transformer is required. Switchboards should preferably be located in readily accessible areas and be clearly labelled. The consultant is to advise whether power factor correction is required and whether tariff rate advantage would be obtained by power factor correction and/or high voltage supply.

All circuit breakers shall be of the thermal magnetic type with quick make, quick break toggle action. There should be approximately 25% spare capacity on the switchboard. The circuit breaker minimum fault interruption capacity shall be 10KA.

All power outlets and lighting points shall be earthed. Individual 30mA residual current devised (RCD) shall be installed on all power circuits. The residual current devices can be combined with circuit breakers.

The number of the circuit breaker, its rating and details of the outlets, fixed equipment or lights served by each sub-circuit shall be recorded on the switchboard circuit schedule.

The Contractor shall be required to balance the load on each phase as far as practicable.

Wiring embedded in walls and floors shall be run in PVC or galvanised metal conduit of adequate size to allow installation of the number of cables proposed. Tough plastic sheathed cable may be used in wall cavities and ceiling spaces shall be installed in accordance with the relevant Australian standard.

9.2 Lights

Flood lighting shall be designed for the arena that takes into account the factors laid down in the WA Track and Field Facilities Manual to ensure adequate vertical and horizontal illuminance. The lighting towers and the Grandstand roof shall be given appropriate lightning protection to the Australian Standard.

The end of life lighting levels required is:

Training	80 lux
Competition	200 lux

Additional lighting attached to the stand roof is to be provided directed at the finish lines to assist photo-finish timing. It is recommended that the lighting design on the finish lines deliver 1400 lux to the photo-finish cameras over the entire width and depth of the finish areas. This lighting should be balanced across three phases to minimise stroboscopic effect.

It shall be possible by separate controls to only activate training level lighting to the back and/or the finish straight lights when lighting of the total facility is not required.

The final location of all lights and switching shall be agreed with the client on submission of sketch plans.

Two-way or three-way switching shall be provided at all locations where there is more than one entrance to the room.

Energy efficient fluorescent light bulbs and indirect fluorescent tube lighting shall be used where appropriate. The lighting levels within the stand and the various rooms shall meet the requirements of the BCA and the appropriate Australian Standards.

Emergency lighting to meet BCA requirements shall be provided to allow evacuation of the grandstand and the rooms therein in the event of a power failure.

The car park and the areas leading to the car park shall be lit to an appropriate standard.

The Consultant shall report on the practicability and cost of upgrading the arena lighting level to colour television quality at a later date.

9.3 Power Outlets

All power outlets shall be standard double three pin pattern. Waterproof outlets shall be provided externally, e.g. in the services pit in the arena.

9.4 Telephones

A proprietary telephone system shall be provided which allows the house telephones also to be used as an intercom. Telephone jack points shall be provided in the following rooms:

Athletics Office
Little Athletics Association Office
Gatehouse
Competition Administration
Technical Store
Competition Director's Room
Announcer's Room
Photo-finish Room
Jury
Post Event Control
Drug Test
Physiotherapy
Presentation Holding
Officials Report and Administration
VIP Lounge

Café
First Aid
Bulk Equipment Storage
Pre-Event Control
Ground Staff

A separate external line is required for connection of a computer modem and/or fax machine in each office.

X public telephones shall be provided in the grandstand.

There shall be a direct telephone link from the service pit on the inside of the finish line to the Photo-finish room.

9.5 Photo-finish

The camera mounting height shall be in accordance with the manufacturer's recommendations. An indication of the likely vertical angle limits is given in the WA Manual.

In-ground conduits with appropriately sized insulated wires shall be provided from the photo-finish camera positions in the grandstand to the arena services pits adjacent to the start/finish lines, 1500 m, 200m and 100 m start lines. In each of these pits there shall be waterproof outlets to allow the Starter to plug in the cables from the two starting transducers.

Connections are to be provided in the adjoining service pit for the portable infra red beam units installed at the finish lines to give an instantaneous time on a portable running time display board. A similar portable time display board is installed at the 200 m mark.

Conduits shall be provided from the Photo-finish camera positions to the Photo-finish Room. The Photo-finish Room shall be located opposite the finishing line.

The Consultant shall obtain the exact specification of requirements from the photo-finish equipment suppliers.

9.6 Silicon Chip Timing System

An antenna shall be embedded in the asphalt under the finish line to allow later connection of a portable computerised silicon chip timing and lap counting system.

The Consultant shall obtain the specifications for the antenna and installation details from the timing system supplier.

9.7 Fire Alarm and Egress

A commercial hard-wired smoke detector system shall be installed with a discreetly located mini-panel at the entrance to the stand connected to FESA.

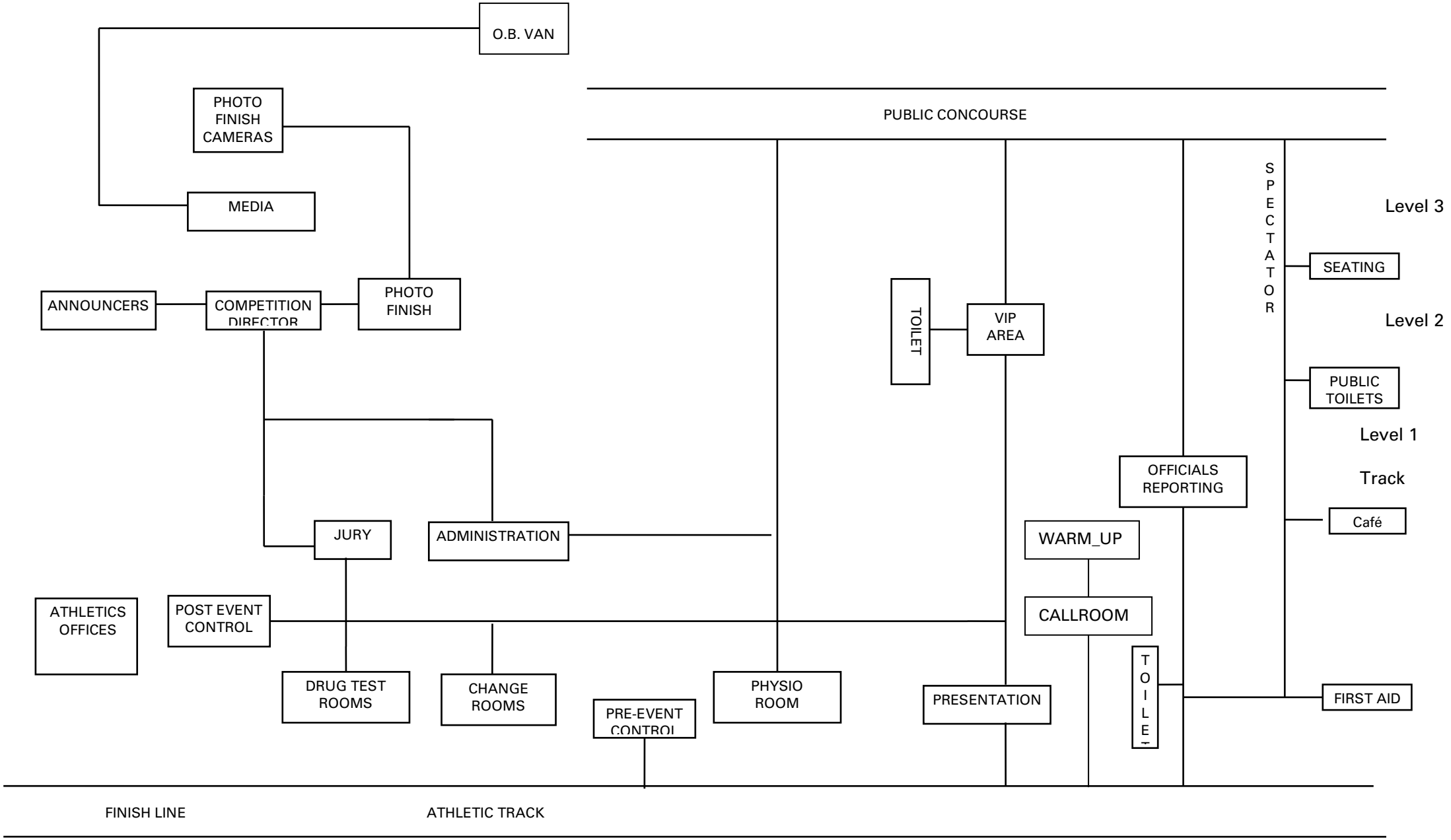
The consultant shall verify that the fire egress from the grandstand building meets both Australian Standard and BCA requirements.

9.8 Lightning Protection

The grandstand's electrical system shall be protected against lightning strikes by a suitably rated self scaling over voltage/lightning arrester installed at a conveniently accessible point close to the electrical mains entry to the stand.

9.9 Site Security System

A site security system suitable for connection to a security service company, incorporating perimeter and building structure security should be provided.



Functional Diagram
Figure No. 1