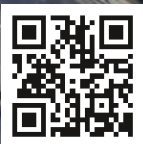
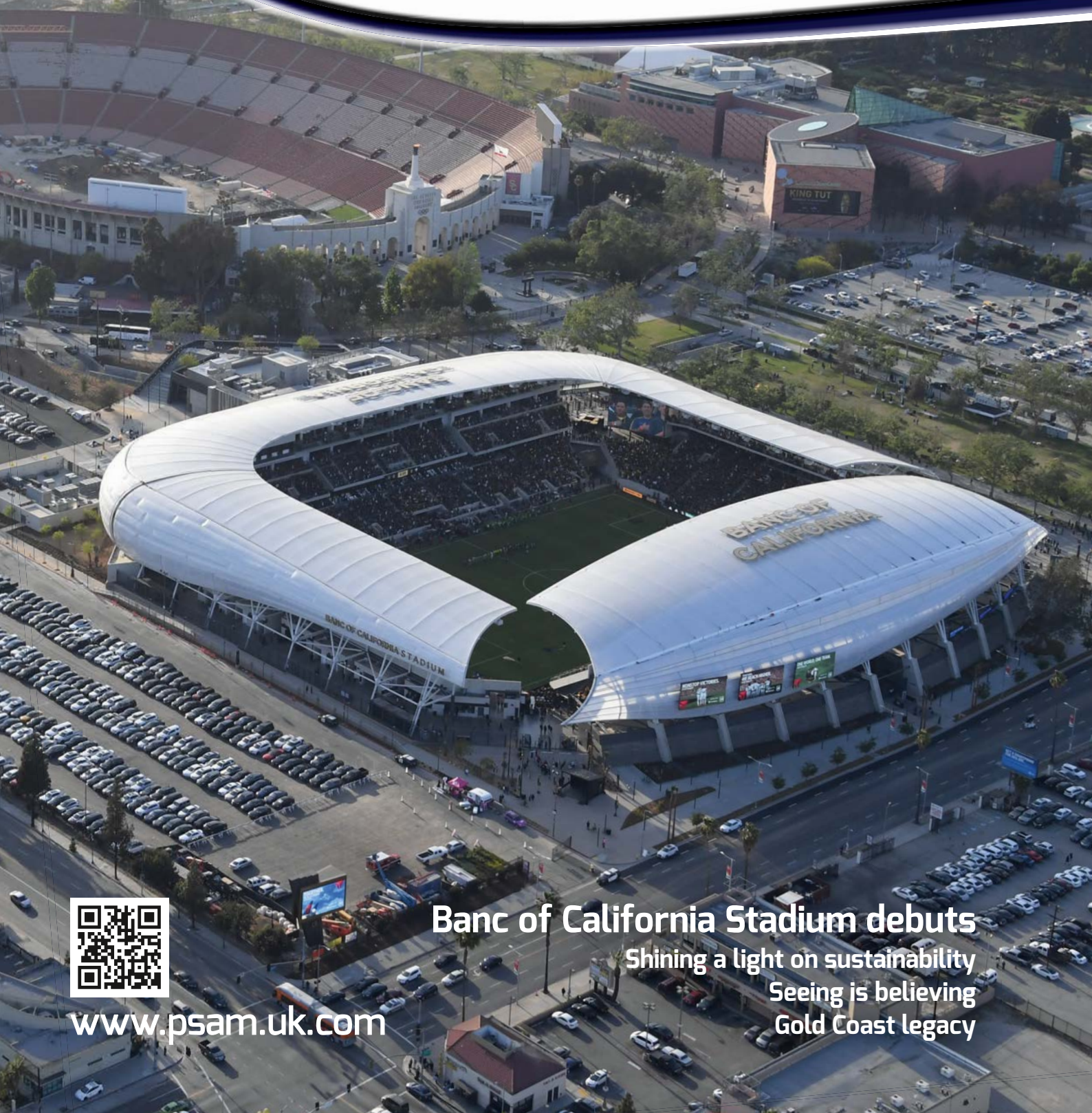


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CONTENTS

CONTENTS

FEATURES IN THIS ISSUE

TRANSFORMERS

TRANSFORMATION OF STADE DU HAMEAU 16

The Stade du Hameau in Pau, France is being remodelled to create a bright future for Top 14 rugby team Section Paloise.

KOREA'S OLYMPIC LEGACY 18

Choosing the right seating system can lead to a successful stadium or arena transformation, as Unitech System's work in Korea shows.

A CATALYST FOR REGENERATION 20

Brentford FC's new community stadium will act as the cornerstone of a new sports and housing development in west London.

VOLKSWAGEN ARENA RINGS THE CHANGES 22

The Volkswagen Arena in Istanbul has been transformed into an international standard basketball venue.

GOING GREEN

SHINING A LIGHT ON SUSTAINABILITY 24

Sports venues can become leaders in sustainability and doing so can also help the bottom line.

ROOFING

RAISING THE ROOF 28

Cost efficient and high performance roofs are at the heart of modern stadium design

TUNNEL VISION 32

Wind engineers need to get involved in the early stages of projects, as Robin Stanfield, Head of Client Management at BMT explains.

OLYMPIC RENAISSANCE 34

A new roof for Montreal's Olympic Stadium will give the iconic venue a new lease of life.

A CHANGING ART 36

In the world of stadium design, structural engineers face some of their greatest challenges as Peter Ayres of AECOM explains.

FLYING COLOURS 37

Low & Bonar developed a membrane for the roof of the Volgograd Arena.

NEXT GENERATION FACADE 38

A new material has been developed to provide a stunning façade for Allianz Field.

AUDIO

SURROUND SOUND 40

Clarity, intelligibility and flexibility are key to delivering superb audio in stadia and arenas.

OILERS AND OPERA 44

Oilers Entertainment Group invested in a state-of-the-art sound system from d&b audiotechnik for Rogers Place.

SINGING THE BLUES 46

Fans of the St Louis Blues have been blown away by the improved L-Acoustics sound system at the Scottrade Center.

HEAR THE LIONS ROAR 48

A new Meyer Sound audio system at Ford Field has improved intelligibility and boosted the fan experience.

SOUND EXPERIENCE 50

PS&AM caught up with the Business Development team at HARMAN Professional Solutions.

FOOD & BEVERAGE

A QUESTION OF TASTE 54

Food and beverage is becoming an increasingly important player when it comes to attracting fans to sports venues.

STAND OUT FROM THE CROWD 58

IRP foodservice carts that stand out from the crowd have the added bonus of scoring free social media advertising for venues.

Brentford FC's new community stadium



THE BIG PICTURE

SEEING IS BELIEVING 60

Video screens can bring fans to the heart of the action, wherever they are in a stadium.

TURKEY'S LARGEST FINE PITCH LED WALL 64

A look at how Colosseo installed its proven technology in Istanbul's main traffic control centre to keep fans safely on the move to and from stadia and arenas in the city.

ANGELS SHINE BRIGHT 66

The Los Angeles Angels debuted their new Daktronics LED displays at the start of the 2018 MLB season.

AFTER THE LIGHT 68

Musco Lighting explains why the warranty backing your sports lighting system is as important as the technology itself.

COMMONWEALTH GAMES

GOLD COAST LEGACY 70

Legacy building has been an important aspect of the Gold Coast Commonwealth Games.

A SUSTAINABLE ICON 74

Inspired by the dynamics of cycling, the Anna Meares Velodrome was conceptualised as an engaging, efficient building, as Cox Architecture explains.

FAN EXPERIENCE TECHNOLOGY

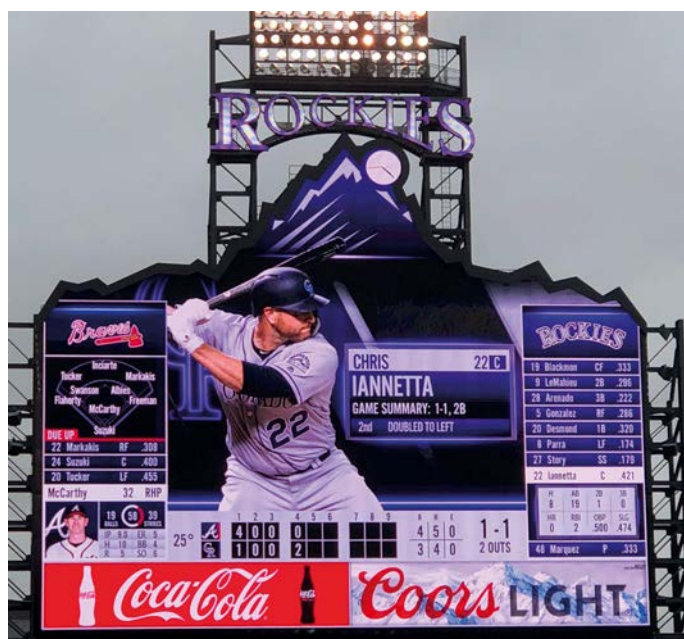
TECHNOLOGY REVOLUTION 88

New technologies being introduced at stadia and arenas are improving customer satisfaction and boosting the bottom line.

LIVE EVENTS

CHANGING TIMES 92

Experts discuss the changing dynamics of the live event experience in this roundtable.



Colorado Rockies video screen

VENUES IN FOCUS

BANC OF CALIFORNIA STADIUM

BANC OF CALIFORNIA STADIUM DAZZLES FOR LAFC 8

The new \$350 million Banc of California Stadium achieves its goal to link the Club and its brand to the City of Los Angeles and Exposition Park site.

AUDI FIELD

AUDI FIELD – FROM DREAM TO REALITY 122

A 22-year dream will come true this summer for owners and fans as the new Audi Field state-of-the-art stadium debuts in Washington.

FACILITY WATCH

FACILITY WATCH STADIUMS 98

FACILITY WATCH ARENAS 126

REGULARS

WELCOME 8

SOLUTIONS SOURCING 114

PLAYING SURFACES

PROTECTING YOUR MAIN ASSET 82

Pitch protection systems are key to staging non-match day events and bringing in extra revenue for venue operators.

LUZHNIKI PROTECTS WITH TERRAPLAS 84

Russia's Luzhniki Stadium, which will host the 2018 World Cup Final, trusts its pitch to Terraplas even at minus 20°C.

AFTER THE FINAL WHISTLE 86

Bosch Rexroth explain how a new removable pitch system can help stadia maximise revenues.

ADVERTISERS' INDEX/NEXT ISSUE 134



Audi Field main entrance

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I was in the US recently and was lucky enough to attend a **Major League Baseball** game at **Suntrust Park** in Atlanta, Georgia.

The home of the **Atlanta Braves** is one of the newest ballparks in the States and fans were attracted to The Battery Atlanta and the venue itself hours before the first pitch was thrown.

A comprehensive selection of restaurants, bars and family attractions drew people into the area early, while a gig starring rapper **Big Boi** kept the visitors in the ballpark for the evening.

What was also noticeable was how the fans enjoyed milling around the expansive concourses during the main event rather than sitting for hours in their seats.

Tables to stand at and enjoy a drink, local food and a chat with friends were liberally scattered around. This emerging trend of creating welcoming spaces away from the main bowl is examined in this issue, as we look at how to increase revenues from F&B offerings.

In the week that the **Green Sports Alliance** Summit also takes place in the US, sustainability issues are spotlighted, with some of the biggest venues in the world showing how they are taking the fight on green issues forward.

The **World Cup** is in full swing in Russia and many eyes will be on legacy plans for the stunning stadia which have been built for the event. How will their legacy be managed once the crowds have gone?

This is also a feature of the recently concluded **Gold Coast Commonwealth Games** in Australia, where strong forward planning looks set to have created a bright future for all the competition venues.

To keep abreast with all the latest stadia and arena developments, don't forget to check out our Facility Watch section in the magazine and please keep me up to date with all your latest stadia and arena news at j.sheehan@hgluk.com.



John Sheehan
Editor
PanStadia & Arena Management Magazine

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This is better than the best

Windsor Park Stadium's redevelopment has coincided with Northern Ireland reaching its highest ever FIFA ranking.

The stadium once graced by George Best has been transformed into a vibrant, unified venue, providing excellent new facilities for players and fans, and securing a football community in the heart of Belfast.

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BANC OF CALIFORNIA STADIUM DAZZLES FOR LAFC

The new \$350 million Banc of California Stadium achieves its goal to link the Club and its brand to the City of Los Angeles and Exposition Park site. Feature writer Steve Traiman gets insight from ownership and architect.

Major League Soccer's Los Angeles Football Club (LAFC) opened their new 22,000-seat stadium with a 1-0 win over the Seattle Sounders before a sellout crowd of enthusiastic fans and supporters on April 29.

After an April 21 open house watch party drew a very enthusiastic fan turnout, the venue is already providing an unforgettable experience for the entire community.

Tom Penn, LAFC owner and president, told *PS&AM*: *"Our goal has always been to build a world-class, state-of-the-art venue in the heart of Los Angeles. We feel that we have built the best soccer-specific stadium in the country, and that LA is one of the markets where we could make this a reality. Los Angeles has everything going for it in terms of its size, its diverse population and the support of corporate sponsors."*

"For us, the allure of truly being a Club that is 'of the city' and authentically being seen as LA's team was enticing. We have always felt that we could provide a new and unique experience to fans and supporters with the stadium's location being so close to downtown. Being able to build a stadium downtown is the new model for the league, and we are already seeing the benefits."

"Our 'Supporters' have been involved with us from the beginning. They are the life-blood of our Club, and we have

seen that from day one. They have been vocal and we have asked for their opinions every step of the way. They are the ones who came to us and made sure that it was a priority to create the safe-standing section in the North End. The energy they create at Banc of California Stadium is a difference-maker, and we have made sure to get their input in building this stadium."

"We and our architect, Gensler Sports, had design sessions with them. As a result, they helped design the Supporters Bar. This collaboration has really helped us create a true family and club atmosphere, and we are hopeful it will expand to the rest of the stadium."

WORLD CLASS VENUE

Speaking for Gensler Sports, Jonathan Emmett, Design Director and Principal, told *PS&AM*,

"Since LAFC became an MLS expansion team in 2014, one of the first tasks for the ownership group was to select a site for their stadium and embark on the design process. We were retained not long after this, and were challenged to collaborate with the Club to create a world class venue that would provide an unparalleled match-day experience for a diverse group of supporters and fans, very much representative of the City of Los Angeles itself."

"The stadium design process ran in parallel with the club's journey to define its own brand and identity. Long before the signing of any players or coaches, the club embarked on a rigorous process of building a strong identity and brand - one that would resonate with the diverse community of Los Angeles and a growing soccer fan base. 'Bring the World's game to the World's City' became an early and important vision for the club."

He said LAFC engaged the local community and the supporters' groups which were already forming, long before the team itself.

"We hosted a series of workshops and brainstorming sessions throughout the design process to bring the club, the supporters' groups and the design team together to conceive not only the physical attributes and amenities of the venue >>



Opening day aerial view with Coliseum at rear
All images courtesy of LAFC

« but also begin to plan the entire game day experience.

“The site for the stadium at Exposition Park quickly presented itself as the perfect location. Home to the iconic Coliseum and a number of LA’s most prominent museums, the Park attracts over five million visitors a year. At the southern end of the Figueroa Corridor, the site is less than two miles from the central business district of Downtown, and directly adjacent to the University of Southern California campus. It has the added advantage of great freeway accessibility, abundant onsite parking and public transportation, including the newly-completed Metro Light Rail Exposition Line.

“The stadium would be designed to accommodate other sporting events, concerts and other non-game day activities, but first and foremost -- this was to be a soccer-specific venue to provide an unparalleled match-day experience. The climate would also be a strong influencer on the design, taking advantage of the ability to leverage indoor-outdoor spaces, natural light, and cooling breezes. A roof canopy to shade fans in daytime summer games was a priority.”

COMMUNITY ENGAGEMENT

The aesthetic of the stadium became a physical embodiment of LAFC and their brand. The goal was to create a stadium image that would be identifiable with the Club and the City – whether watching

from the stands, on TV or driving past on the 110 freeway.

Set right up against Figueroa Street, the venue engages the community and opens up views for passers-by to look into the stadium.

The base is constructed of board-formed, cast-in-place concrete (similar to the historic Coliseum next door) and black slate, embodying the foundational strength of the club and the gritty texture of the streets of LA.

Rising above is the futuristic roof canopy – white-painted steel, clad in translucent ETFE. Its dynamic form relates to the Wing image at the core of the Club brand and the City of Angels.

The translucent material lets in daylight, while providing shade, to create a light and bright atmosphere while adding to the intimacy of the venue.

The main entry plaza on the west side was conceived as a 365-day space to serve visitors to Exposition Park and the local community. A mix of hardscape and landscaped spaces provides inviting places to sit and gather whether coming to a game or visiting one of the museums in the park.

The plaza provides access to the stadium as well as a flagship LAFC HQ team store and a year-round signature food experience, The Fields LA.

It brings together eight of Los Angeles’ hottest chefs under one roof in an authentic food hall environment. Additional cafes and outdoor dining surround the plaza.

A roof deck is set up to host private events and parties, capturing views back to Downtown, the Hollywood sign and the neighbouring Coliseum.

Taking inspiration from many of the great European and British football grounds, everything is focused on the FIFA-sized pitch.

Seats are closer to the action than in any other MLS venue, as close as 12ft behind the goal line. The bowl is intentionally steep, up to 34 degrees, with large cantilevers and standing room terraces looming over the field.

The focal point is the Supporters Section in the North End, inspired by iconic venues such as the **Kop at Anfield** and **Borussia Dortmund’s Yellow Wall**.

Capacity is 3,252 for the five key supporters’ groups, a testament to their involvement in its design.

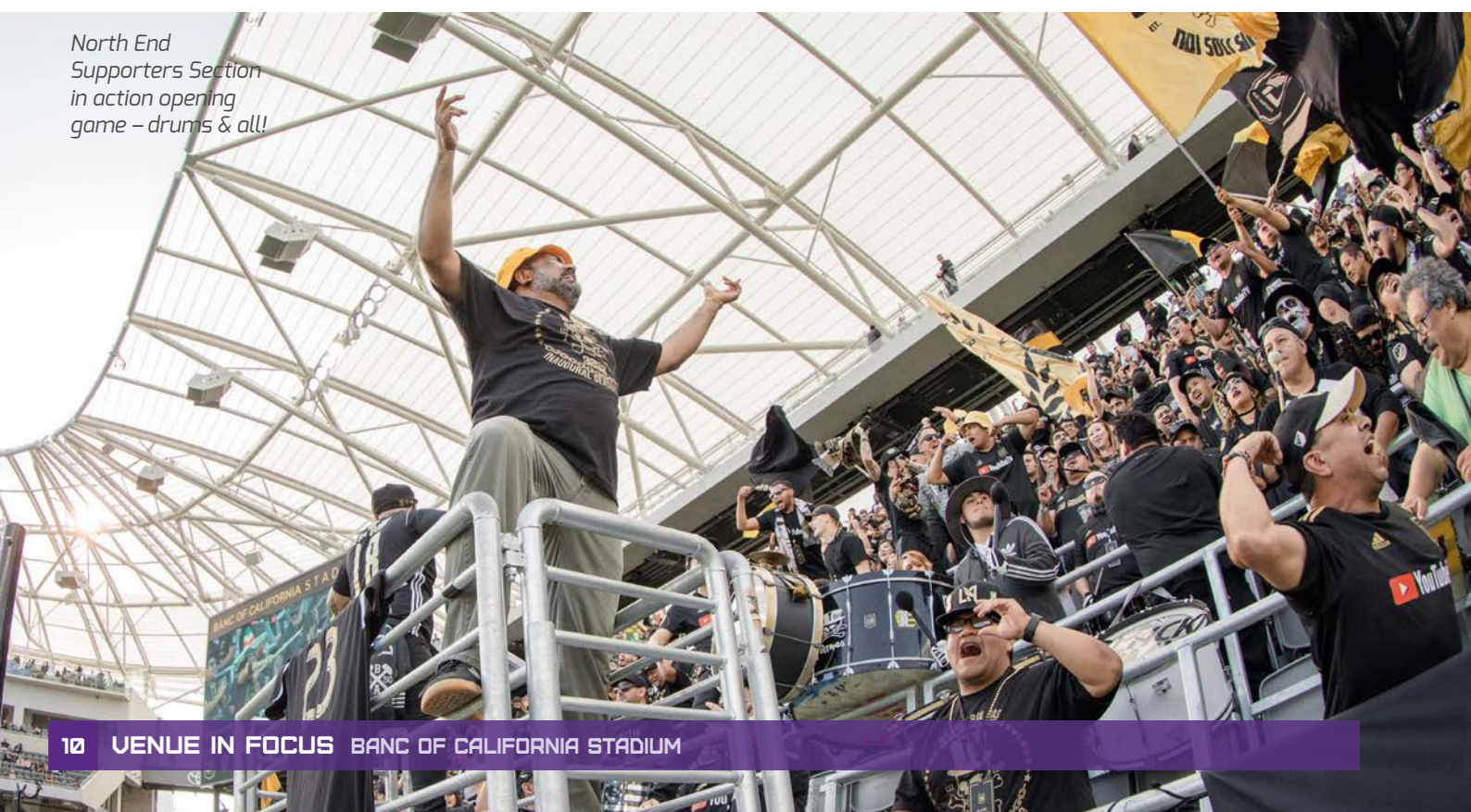
The section is made from aluminium treads, demountable to create a stage location for concerts. The aluminium system is incredibly loud when fans jump up and down.

The roof canopy above covers the entire section and is clad in a translucent ETFE material, stretched tight like a drum over the steel structure, reflecting the sound of the supporters’ chants, drums and stomping, back out to the crowd.

At the top of the section is an open concourse with a huge bar, allowing supporters to grab a drink or snack without missing a moment of the action.

A key attribute is the diversity of options and experiences. A number of open »

North End Supporters Section in action opening game – drums & all!



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« standing room decks allow fans to move around the venue and experience the match from different perspectives.

Concessions are all well-loved local brands such as **Beer Belly**, **Chicas Tacos** and **Bludso's**, building on the notion of authenticity and a uniquely Los Angeles experience.

A couple of small breaks in the upper seating bowl were created to reinforce the connection to the city.

The symbolic "front door" of the stadium is on the northeast corner. This opening frames a view from the seating bowl to the ever-growing skyline of Downtown and the mountains beyond.

A smaller portal on the northwest corner frames views of the iconic Peristyle and Olympic Flame at the neighbouring Coliseum and the Hollywood Hills.

Hospitality decks, clubs and lounge boxes have been carefully placed to capture great views of these same areas.

KEY PREMIUM EXPERIENCES

The Los Angeles market demanded a broad range of premium experiences, incorporated into this venue in an unprecedented way.

The main clubs offer guests distinct locations, amenities and experiences around the venue. Each club was designed to not only serve game day needs for members, but also to provide flexible and unique spaces for non-gameday uses and events.

The **Field Club** gets fans close to the action and see the players take the field

as they walk in and out through the club lounge.

The space builds on the team brand and colours, Black and Gold, and draws on deco influences of old Hollywood that were influential in design of the team crest and wing motif.

The Founders Club is a light and airy space on the mezzanine level, decorated in whites and soft wood tones, influenced by the west side beach culture. The club comprises indoor-outdoor spaces, with views of the pitch to the front and the Santa Monica mountains from the terrace at the back.

The Figueroa Club on the east side has a distinctly more casual feel. Exposed concrete and steel, street art, and salvaged wood communal tables give the feel of a gastro pub you would expect to find in the Downtown Arts District.

Each club has associated suites and loge boxes that play off the distinct character of each club.

One of the most unique spaces is the **Sunset Terrace**. With a relaxed and comfortable "Palm Springs" vibe, it serves guests sitting in sofas and lounge chairs watching the game.

Four "cabana suites" with fully retractable glass walls open up onto the terrace.

Another premium experience is **10 Field Suites** where the first rows are right on the pitch, without barriers. Each has direct access to a private lounge behind the seats.

The most exclusive experience is the **Directors Box and Lounge**. The midfield Box seats 80 in lounge chairs and

another 40 at drink rail seats with the best views in the house.

A private elevator and stair take guests down to an exclusive lounge and dining room where pre- and post-game hospitality is provided, close to the home team locker room.

Throughout the entire venue, **Legends Hospitality** have collaborated closely with LAFC and the design team to ensure that the level of service, and food and beverage is exceptional and authentic to Los Angeles.

Owner and president Tom Penn summed up: *"Gensler Sports and their professional and experienced Project Team translated our – and our supporters and fans – vision into reality."* ■

LAFC BANC OF CALIFORNIA STADIUM

Project Team and Fact File

Location	Los Angeles, California
Opening Date	April 29, 2018
Construction Cost	US\$ 350 Million
Owner	Los Angeles Football Club (LAFC)
Operator	LAFC
Capacity	22,000 seats
Architect	Gensler Sports
Project Manager	Legends
General Contractor	PCL Construction Services
Structural Engineer	Thornton Tomasetti
Services (MEP) Engineer	ME Engineers
Civil Engineer	KPFF
Engineering Maintenance & Housekeeping	ABM
Landscape Architect	MLS
Field Consultant	Millennium Sports Technologies
Integrated Technology	IBM
Videoboards/LED Screens	Panasonic
Telecom & Wireless	Mobilitie
F&B Concessionaire	Legends Hospitality
Major Tenants	MLS LAFC

Amenities

33 Suites include 10 Field Level, 11 Sunset Deck, 12 Founders Club; 46 Loge Boxes include 18 Figueroa, 7 Director's Club, 10 City View, 11 Sunset Level; 5 Club Spaces include Director's Lounge (owner access), Field Club, Founder's Club presented by Banc of California, Figueroa Club, Sunset Deck; Fanatics Team Store.

Opening day fans on way to main entrance



PERFORMANCE	180	14	5	130
INNOVATION				
EXPERIENCE				
	SPORT STADIUMS	COUNTRIES WORLDWIDE	OLYMPIC GAMES	MM YEARLY SPECTATORS

NEW STANDS TO TRANSFORM LORD'S

The stunning new Compton and Edrich stands at Lord's will increase capacity at the cricket ground by 2,500 seats.

Marylebone Cricket Club (MCC) has unveiled **WilkinsonEyre's** designs for the new **Compton** and **Edrich** stands which will form the next phase of the **Lord's** Masterplan.

The new three-tier stands will accommodate around 11,500 members of the public and transform the venue at the Nursery End of the Ground in north London.

Capacity will be increased by 2,500 seats, and a walkway linking both stands and overlooking the Nursery Ground will be introduced.

From the Pavilion, MCC Members will still be able to view trees through gaps in and over the top of parts of the new stands.

MCC chief executive and secretary Guy Lavender said: *"MCC is committed to ensuring Lord's remains the best place in the world at which to watch and play cricket."*

"These new stands will transform the Nursery End, providing world-class facilities, opening up views both to

the Pavilion and back towards the Nursery Ground, and adding another architectural enhancement to Lord's."

A planning application will be submitted later this year to Westminster City Council after consultation with local residents.

If consent is granted, MCC Members will be asked to approve the plans at the Club's AGM in May 2019, and work to demolish the existing stands will begin after next year's Test Match against Australia.

UPDATED MASTERPLAN

The building work is part of MCC's Updated Masterplan which resulted in the opening of the new **Populous** designed **Warner Stand** in 2017.

The timeline of the Updated MCC Masterplan is:

2019-21: new Compton and Edrich stands with up to 2,500 extra seats built. The new stands would not go above the **P. Morgan Media Centre**, which is a building of merit and likely to be listed, but will leave space around it.

2021-22: new East Gate Building (first phase).

2023-25: East Gate Building (second phase), including goods entrance, car park, shop, hospitality facilities and ECB offices.

2025-26: demolition of the Nursery Pavilion and extension of the Nursery Ground playing area up to the Wellington Road. The Nursery Ground would be slightly larger than at present.

2027-30: construction of the South-Western Project, principally including the redevelopment of the **Tavern** and **Allen Stands** and Lord's Tavern.

2031-32: new facilities for groundsmen and ticket office staff would be built at the North Gate.

As part of MCC's obligations to the **England and Wales Cricket Board** and the **International Cricket Council**, no redevelopment of any stands will take place at Lord's until the completion of the 2019 cricket season, which includes an **Ashes Series** and the **ICC Cricket World Cup**. ■





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TRANSFORMING THE STADE DU HAMEAU

The Stade du Hameau in Pau, France is being remodelled to create a bright future for Top 14 rugby team Section Paloise.

When French rugby team **Section Paloise** was promoted to the Top 14 league in 2015, plans to transform their home stadium were accelerated.

The **Stade du Hameau** in the city of Pau near the French Pyrenees has undergone a metamorphosis in just over 18 months, to bring it up to the level required for elite rugby in France.

The Stade du Hameau, which is also the home of **Pau FC**, originally had a capacity of around 13,000 including space for 6,000 fans in standing only areas. VIP accommodation consisted of just 176 seats.

The transformation project to bring the venue into the modern era was the brainchild of three men: Club President Bernard Pontneau, Vice-President Yannick Le Garrères and François Bayrou, Mayor of Pau and president of the Agglomeration.

Bayrou said: *"The idea was to reinterpret the existing and develop an original, beautiful and innovative project. This project respects a logic of sustainable development in that it transforms the existing and gives it life without destroying anything or wasting anything."*

Le Garrères added: *"Beyond his passion for rugby, the mayor was won over by this project because of the opportunities it presented and the evolution it represented for his city."*

"This stadium brings Section Paloise into a new dimension, particularly in economic terms."

PHASED APPROACH

Stadium Manager Sylvain Caliman explained how the venue was transformed in three phases over a year and a half.

It has been built in a U-shape with a white and translucent outer cladding creating an overall unity.

Caliman said: *"Stade du Hameau was not suited for the ambition of our club and was not a source of finance for the club. We decided we needed to remodel the stadium."*

"In May 2015 Section Paloise was promoted back to the Top 14 league and to keep up with league requirements a temporary stand with 2,997 seats was installed. A new VIP area was created in the East Stand and refreshment stalls added. The floodlighting system was also upgraded and a removable giant screen installed."

"A security checkpoint was added as well as TV commentary position and press box in the Honour Stand."

In 2016 architect **Cabinet Camborde** was appointed to design the stadium and

work began in September 2016.

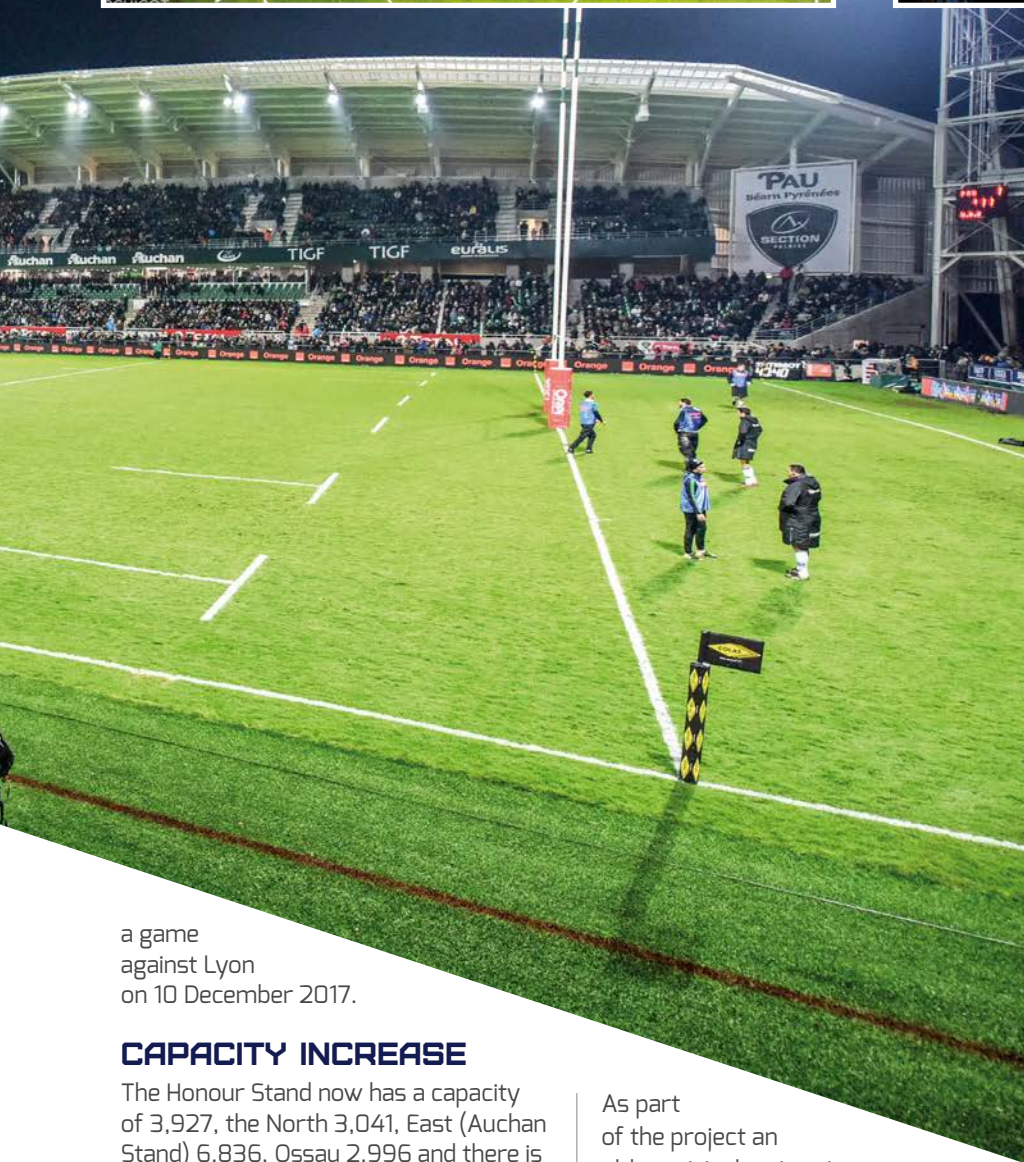
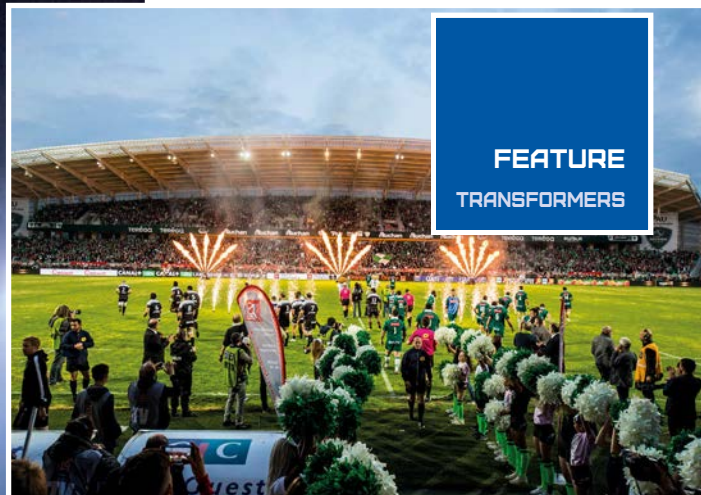
Phase 1 from September 2016 – February 2017 saw the remodelling of the **Honour Stand** including a new shop and new toilets. Construction was also started on a new **North Stand**, while capacity of the **East Stand** was expanded with 1,300 more seats.

The ground floor of the Honour Stand was enlarged and modernised with various spaces added including a players' dressing room, a room for the video referee and a President's reception room.

There is also a doping control office, an infirmary equipped with the Vogo System, two dressing rooms for event days and space for video analysts.

Phase 2 of the €15 million project was carried out between February 2017 and August 2017 and involved the roof of the North Stand being added. Work to add a roof to the East Stand was started.

Phase 3 involved more work on the North Stand and opened it in time for



a game
against Lyon
on 10 December 2017.

CAPACITY INCREASE

The Honour Stand now has a capacity of 3,927, the North 3,041, East (Auchan Stand) 6,836, Ossau 2,996 and there is standing in Passage East for 1,130.

Caliman added: *"After 18 months of construction our stadium capacity is now at 18,324 with 1,130 standing."*

"We had three targets for the project. The first was aesthetic with the East and the North Stands giving a new look to the stadium. The second one was economic. It was one of the cheapest stadium projects in France. Another target was sustainability. We are working to make the stadium environmentally friendly."

As part of the project an old municipal swimming pool was also converted into a professional training centre for the players – the **Macron Training Centre** – with a medical area, video office, dressing room and exercise room. It was built for only €2 million.

Caliman added: *"Also in the stadium our VIP accommodation has seen a big increase from 176 in 2012 to 1,721 seats currently. That is a fantastic opportunity for us to develop our VIP offerings."*

Some of the VIP accommodation is located on the second floor of the North Stand and includes Loge boxes for 12 with a bar looking directly onto the field of play.

The Stade du Hameau has also seen a big improvement in its facilities for disabled people with 32 disabled places in the stadium and also 34 parking spaces right in front of the stadium for direct access.

"The project has been a great success because after 18 months of work we have a beautiful stadium on which we can base the future of Section Paloise," Caliman added.

FUTURE WORKS

Not content with what has already been achieved at the Stade du Hameau, the management team is also looking to carry out further works at the venue.

The old pitch was ripped up at the end of the 2017/2018 season and a new one is being installed in time for kick off of the new season in 2018/2019.

The venue is looking to become 100% connected with WiFi available throughout, with the Vogo Sport system also being installed.

A fan zone is being created and a section for kids established in one of the stands. New car parks are being built and a new brasserie will open.

Within the next three or four years, the stadium will be closed for more major works with a new **Ossau Stand** due to be built, which will include office space.

New roofing will connect the North, Ossau and Honour stands and a giant video screen will be installed on the corner of the Honour and Ossau stands.

The further improvements are designed to future proof the stadium and make it a special home for Section Paloise for many years to come. ■

KOREA'S OLYMPIC LEGACY

Choosing the right seating system can lead to a successful stadium or arena transformation, as Unitech System's work in Korea shows.

One of the most significant renovation projects currently taking place in the sports and entertainment industry is the **Olympic Cultural Heritage Gymnastics Arena** in Seoul, Korea, which is being carried out by the **National Sports Promotion Corporation** of the **Seoul Olympic Games**.

Originally built in 1988, the venue is the largest of the five venues in **Seoul Olympic Park** which were used as the main facilities for the **1988 Olympic Games**.

It was first used as an Olympic gymnastics arena in 1988, and afterwards was transformed into a venue for various concerts.

With Korean K-POP becoming popular all over the world, plans were drawn up to renovate the arena to create a venue which had a new identity and could accommodate a wider range of events, while preserving the historical and symbolic significance of the existing structure.

One key idea was to establish the venue as the largest in Korea (with a 15,000 seat capacity) for the growing global phenomenon of K-POP and help trigger more international tourism.

One crucial factor in transforming a sports venue to host a wider variety of events, especially concerts, is to have the right kind of retractable/telescopic seating system in place, both for customers and venue operators.

Today's customers have raised expectations in terms of having a very comfortable and stable seat with a clear sightline to the stage.



Seoul Olympic Arena

On the other hand, venue operators want a system which allows for the seats to be retracted quickly and safely to minimise changeover time and associated costs.

It was for these reasons that industry leader Unitech System was chosen to supply 6,520 Tip-up seats for the project, along with additional temporary and fixed seats.

The Telescopic Seats are composed of multi-tiered platforms that minimise the use of space for all multi-purpose requirements and can be operated either automatically (motor driven) or manually.

The construction period was scheduled from October 10, 2017 to the middle of June 2018, and work is in the final stages of completion.

PYEONGCHANG WINTER OLYMPIC GAMES, GANGNEUNG OVAL

Before the **2018 Pyeongchang Winter Olympics** in February 2017, the **Gangneung Oval** was unveiled for the **2017 ISU Speed Skating World Championships**.

It was praised by the **International Olympic Committee (IOC)** for its size and operability.

In 2016, Unitech System proposed a temporary design for the venue. The Olympic committee saw this as a positive in terms of reducing the budget and reduced management costs after the Winter Olympics.

Unitech System was selected as the seat supplier and successfully completed the contract on time and in budget.

The Gangneung Oval was planned and constructed as a temporary venue with a total of 8,000 seats, including for fans, journalists and VIPs.

The double track 400m skating rink is overlooked by a grandstand and air conditioning has been installed beneath the seats to increase spectator comfort. In addition, the platform has been made of aluminum to give a more luxurious feel.

The Gangneung Oval Stadium was constructed as a temporary stadium, but it is now expected to be retained as a semi-permanent facility according to the wishes of local people. ■



Gangneung Oval

A NEW MODEL

A new way of thinking may be necessary when it comes to transforming and upgrading sporting venues, as AECOM explain.

Transformation abounds in the US facilities market, just ask anyone. Multiple iterations on the term; transformative, transformational, transitional are all the rage. So what gives? Rather than identify a specific project as the guiding light in a sea of facility evolution, let's delve into some of the underlying motivations.

To say that "revenue" is a trend would be almost passé but this is still the driving force. The concept of Moore's Law may have finally arrived into the facility industry, but is industry ready for this?

Until recently, common understanding was that a building would last several decades before needing replacement. We are at the precipice of a shorter, almost retail-esque type of lifespan for sports venues.

In fact, live entertainment via sports will continue to be in a race for two precious commodities; time and money.

"Social Spaces" is the current trend in saving ageing sports venues – or so we believe. While teams and venues rush to modify underperforming inventories in stadiums/arenas to add community type experiences, society has likely moved onto the next "big thing."

The notion that Millennials will evolve in their purchase habits seems absent from our current dialogue on transforming venues.

Experience has always been the key motivator for why people choose to leave home and attend the venues. This could be a challenge for the current industry of nationwide sales staff, venue designers pushing prototypes, and industry partners looking for "brand consistency."

Some teams and venues realise this new truth while others remain committed to past methodologies.

While barber chairs and fresh paint will always create solid "clickbait", reality dictates that when the paint dries and the clicks fade, about the time the last cheque is cashed, another refresh should be on the way.

We in the venue industry need to become more comfortable with



the economics of our evolving business model.

REFRESH, TRANSFORM, EVOLVE

A new model of renovation, refresh, transform, and evolve will drive future operations. In recent years the questions of highly limited use, think "8 days a year," have become harder to dismiss.

While 24/7/365 is clearly a solid catch phrase, meaningful implementation of this concept has yet to be discovered and implemented in a business context.

Recently the notion of "pop up" retail was explored by different teams and venues for a sporting season. There could be broader application of this financial model for venue revenue streams.

Other concepts such as the "test kitchen" concept or business incubator model may have a place in venues as a way to create meaningful and local experiences as well.

There seem to be many pragmatic hurdles within the current context of venue planning and operations to implementing these ideas. However, realistic implementation may not be too much of a stretch. The good news is our current venues have the infrastructure necessary to accommodate this.

Re-thinking the basic transactional underpinnings which continue to drive venue planning and operations inhibits true innovation. Creating a venue which

could transform 50% of its experiences every season has the potential to be a powerful draw.

Maybe venues could learn from industries outside of sports & entertainment? Venue focused professionals may need help to evolve.

The current trend is to create amazing fan experiences in venues which make fans choose between a season ticket or access to a premium experience through a purchased seat. The result is clubs are full and seating is empty or vice versa.

Why can't we have it both ways? Is the solution somewhere between revisiting sales ratios and capacities to offering something more than Standing Room Only?

The challenge for designers, operators, salespeople, and leagues, is creating opportunities to coexist in an ever-changing economy.

While sports rules will change, and our media consumption continues to evolve, the game will always be the game.

The new model is about gathering people around a common interest or activity without prejudice for individual seat or community.

This idea, while simple in concept, will be viewed as radical in implementation as there are many elements of this which will challenge our current industry norms. To see real transformative change to venue experiences and consumption, it may be time for a new model. ■

A CATALYST FOR REGENERATION

Brentford FC's new community stadium will act as the cornerstone of a new sports and housing development in west London.

If planned properly, stadia can have a regenerative effect on adjacent areas and deliver socio-economics benefits that go beyond job creation.

As a result, the community benefits they deliver often allow the relaxation of certain local planning guidelines that can restrict development.

Brentford FC's current home is the 11,000 capacity **Griffin Park** in west London. The stadium is over 100 years old and, similarly to many other football stadia in the UK, has seen significant development on adjacent land since being built.

Stadia have long been catalysts for economic and social regeneration, however if unplanned this can provide future operational issues for clubs.

At Griffin Park, the lack of available space nearby has restricted Brentford FC from making any financially sustainable long-term investments.

However, the stadium has a high land value and is highly sought after by residential developers. This increased land value has created an opportunity for the club to evaluate relocation prospects funded through the sale of their existing asset, though it is worth noting that this alone would not be sufficient to fund a new stadium that is compliant with English **Premier League** standards.

Since investing in acquiring land near Kew Bridge Station, Brentford FC has been able to enter into a development agreement with a residential builder which will fund the construction of a new, 17,250 capacity Premier League-compliant stadium on a new site a few hundred yards away from Griffin Park.

DEVELOPER FUNDING

The developer will fund the new stadium through the income generated from building, selling and renting new homes on the land adjacent to the new stadium as well as on the existing Griffin Park site.

Due to the wider regenerative benefits that a stadium can bring, normal planning guidelines related to affordable housing will be reduced.

The new stadium, which is due to be completed by late 2019, will be at the heart of a new 910 home development.

Unlike other recently completed stadia, the stadium design and business plan is focusing on match day income and broadcasting revenues rather than investing in non-event day facilities, such as full-time hospitality and a conference business which could become an operational and financial burden in the future.

This includes making the stadium compliant for **Premiership Rugby** so that the number of match days can be doubled, should an agreement be reached with a suitable club.

By providing dedicated community facilities outside of the stadium and non-residential uses around a central plaza, the development will become a place that people will want to come on non-match days, acting as a new catalyst for further regeneration.

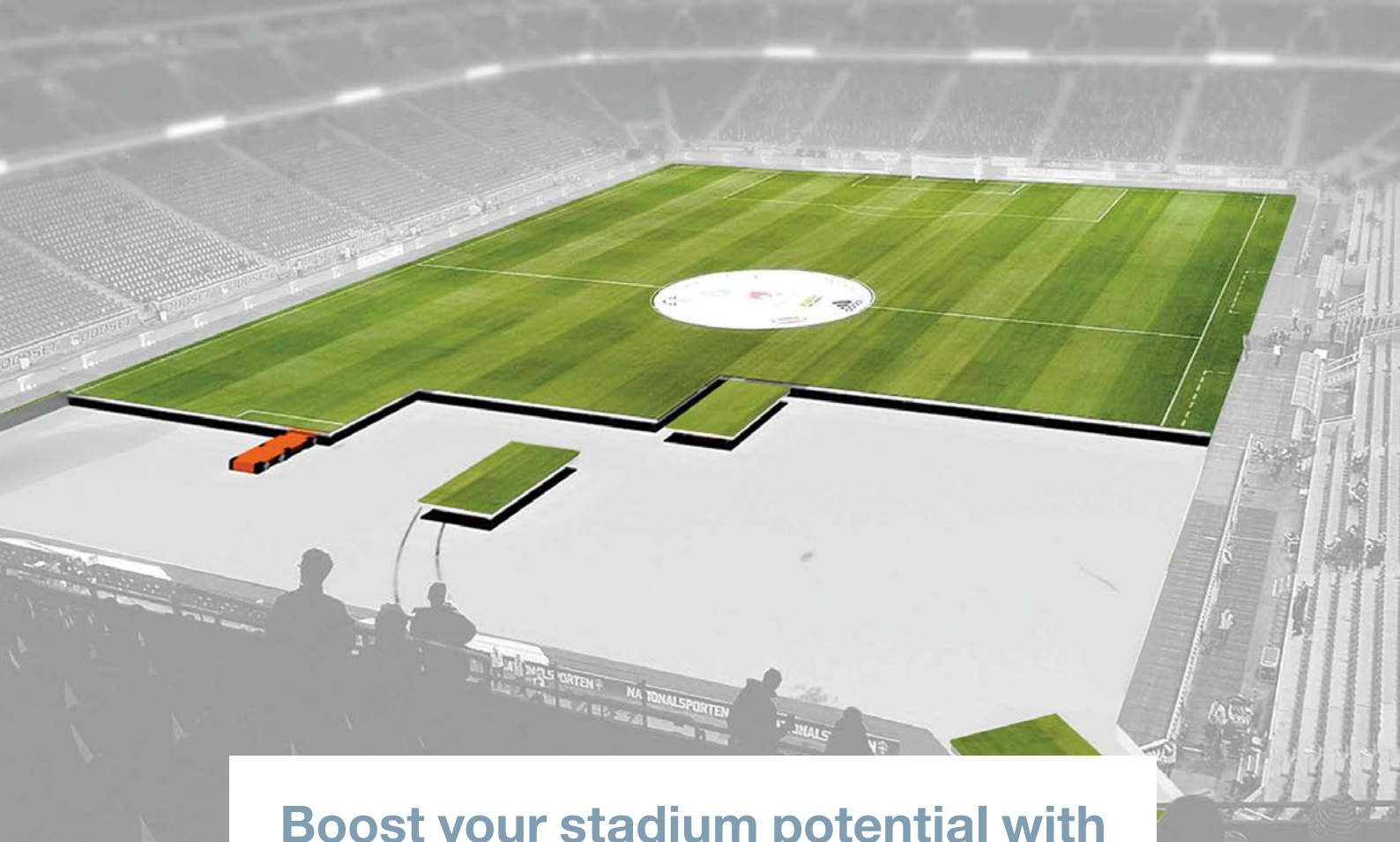
Unlike Griffin Park, the masterplan includes 360-degree access around the stadium to deliver improved operational efficiency and also offer the opportunity for future investment.

Since 2009, **Mott MacDonald** has been providing cost consultancy support to Brentford FC which has helped to identify the optimum development solution.

The new stadium is already recognised as one of the most significant and exciting developments in the history of Brentford FC.

A cornerstone of their long-term vision and based upon a brief and design focused around a robust business plan, it will help ensure a sustainable future for the club over the coming decades. ■





Boost your stadium potential with

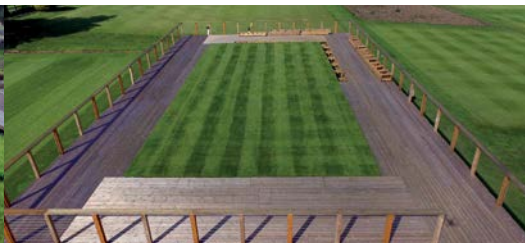


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VOLKSWAGEN ARENA RINGS THE CHANGES

PS&AM caught up with Cem Sencan from the Volkswagen Arena in Istanbul, Turkey, to discuss how the venue has been transformed from a concert music venue into a multi-purpose arena.



Can you please give us a brief overview of your previous experience in the entertainment sector and in your opinion how does this sector differ in Turkey compared to more mature markets in Europe and the United States?

I'm originally from the sports side and I was the Director of Operations for the 2010 Basketball World Cup in Turkey for which we built/refurbished five different venues with general and local authorities.

I then moved to work with AEG at the Ülker Sports Arena and since 2015 I have been director of the Volkswagen Arena with Pozitif.

As you know, big facilities are needed for popular sports and there is a necessity to utilise them for a large number of days throughout the year.

A high utilisation level of the space is such a valuable advantage for a venue, especially when you can combine world class-sports with world-class music content.

This increases the attraction for sponsors, which is the main revenue driver, with the addition of ancillary

income such as food & beverage, ticketing sales and merchandise. Similar to in Europe and the US, the Turkish market has evolved within sports.

There have been investments in stadiums and arenas by the state and private equity and investors are becoming more familiar with the importance of the venue's success in business.

If you look at the Football Money League report by Deloitte, the significance of a stadium's capacity to the powerhouse clubs is very evident.

Due to the fluctuation in local currency and safety concerns in the region, the extension of tours has been limited in Eastern Europe.

This has led our market to focus more on local music or alternative content such as e-sports, corporate gatherings, basketball events, conferences and award ceremonies.

When did you join the Volkswagen Arena and at that time what kind of events was the venue mostly used for?

Volkswagen Arena is a multi-purpose indoor arena with the best

infrastructure for amplified acoustics in Turkey. It not only hosts music concerts and exhibitions but it is a real multi-purpose arena that can be transformed into an ice rink, conference room, fairground or an international standard basketball arena.

The story of Volkswagen Arena is quite unorthodox because it is very rare to find a completed concert venue which has had a basketball function added later.

Darüşşafaka Basketbol's acceptance into the Euroleague forced us to convert the Arena to a multi-purpose venue where we can host top level basketball competitions as well.

Who operates the venue, how does it differ from other venues in the city and what is the capacity for live events?

The venue is operated by Pozitif, a creator of unique and authentic cultural, arts and entertainment experiences since 1989. Pozitif helps connect communities, creators and brands from Turkey and abroad through clubs, venues, media platforms, music and cultural publishing activities.

As Pozitif's first arena management initiative and one of Europe's most acoustically advanced live performance venues, Volkswagen Arena stands out as being the first indoor music and performance centre in Turkey with an amplified live performance infrastructure. The arena was built specifically for live performances.

I think that the uniqueness of the Arena is its versatility. Every day we host totally different events from basketball to conferences, award ceremonies, family entertainment and boxing, etc. If you look at the pictures of every event it would be hard to say it's the same venue.





The capacity of the arena is flexible, depending on different configurations for different events, and a combination of seating, standing and lounges and VIP boxes, with 24 private lounge suites.

The capacity for basketball is approximately 5,000 while for concerts, depending on the configuration, we can host up to 6,500 people.

This is an ideal capacity for the market considering both functions.

Can you please explain the incredible story about how the venue came to be used to host major basketball matches including when this possibility was first discussed and what timeline you were given to achieve this?

As I've mentioned, in late 2015, the Volkswagen Arena was configured to host basketball events and was officially inaugurated as the home arena of the Turkish Basketball Super League club Darüşşafaka, for Euroleague home games.

Our approach was to achieve this in an almost invisible way. We didn't touch the main front of house areas and almost kept it the same.

The main changes were in the infrastructure and back-of-house areas such as storage and access to the venue. The result was hard to believe.

First-time visitors thought that the venue had been built specifically for basketball, while our existing fans were

relieved when they saw that the concert look hadn't changed.

What were the main challenges that you faced in converting the venue both from a logistics and time perspective? Were you expecting all the difficulties that you faced during the conversion or did some unexpected problems also occur?

One of the biggest challenges was to arrange the basketball and concert set-up traffic for back-to-back event days. This was a huge success to achieve especially since this was not a part of the Arena design at the beginning. Also, the installation of telescopic tribunes was important to increase capacity.

However, there was a challenge for our bar setup for the concerts so we found a solution and procured mobile-telescopic tribunes which enabled us to remove them for concerts.

What are the main differences in terms of the venue configuration between basketball and other live events that you host such as concerts and what logistical challenges does this present?

Obviously the basketball setup is quite heavy and very different from concerts. I can say the biggest difference is lighting. In basketball broadcasts our court lighting level goes up to 2,500 lux. However for concerts we only use show lights and the hall is quite dark to create an immersive ambiance.

How pleased were both you and also the basketball club with the end result and following the successful conversion how has basketball evolved at the Arena? How important a source of revenue are basketball matches to the venue?

Let me start with our recent success with our team winning the recent Eurocup Final. As the Volkswagen Arena, we know that we were an integral part of this success and we couldn't be prouder of the team. We know that they feel the same way about the Arena and Arena staff.

Basketball has brought a different type of reach to a different target group for the Arena. We feel that the music content and basketball are a good match to reinforce each other.

Are there any new initiatives that you are looking to introduce into the venue in the near future?

Just like the other sectors, technology is the main factor changing our business. Our definitions of experience are changing so to keep up with this we are redesigning all the pillars of the customer journey so our main focus on new initiatives is directed towards digital. Our goal is to make sure that the venue engages with its fans throughout the year. ■

SHINING A LIGHT ON SUSTAINABILITY

Sports venues can become leaders in sustainability and doing so can also help the bottom line.

Sports venues around the world are embracing sustainability initiatives as they look to promote good living and cut costs at the same time.

From installing LED lighting to composting and using environmentally friendly cleaning solutions, venue owners and operators are waking up to the options available to them.

At the same time, fans are demanding sustainable action from the stadiums and arenas they visit.

Norman Vosschulte, the **Philadelphia Eagles'** director of fan experience, said: *"What I hear at a lot of colleges and universities in the US is that the students are very, very interested in sustainability and it is becoming part of their lives. I think the sports team and the sports fan of the future will want a team or an event like the Olympic Games to be sustainable. They'll expect it."*

"I think if you're not, you're going to be behind the eight ball. I think in the next 10-15 years you'd better be engaging your fans because they'll be expecting it. Engage the fans before they engage you."

The Philadelphia Eagles stage 25 events a year at **Lincoln Financial Field** and welcome 2.5 million visitors. Vosschulte outlined some of the sustainable initiatives in place at the venue.

He said: *"We have 11,000 solar panels in the parking lot, one of the largest solar power plants of any stadium in the world, and we produce 4MW, about 40% of our own energy with that. We have wind turbines fixed to the top of the stadium."*

"We're working with partners on how to organically engage fans with sustainability."

He said the Eagles sort recycling themselves because of cross contamination. He added:

"When you do the recycling yourselves you can make more money. We used to send it to be automatically sorted. We used to get \$75 a ton for aluminium and then we thought what if we baled our aluminium separately, and we found out we could get up to \$1,500 a ton for it. We now bale our own aluminium and we're making good money out of it."

Sarah Smith, facilities manager and sustainability lead for the English **FA** said her organisation has defined sustainability *"as the need to be efficient in the present and ensure that we protect the needs of future generations."*

She said: *"Our strategy started in 2016 when the FA wanted to make Wembley and St George's Park world leading, inspirational venues."*



Lincoln Financial Field



Recycling bins at the MCG

"We are a zero to landfill waste site and have been since 2010. We have three main waste streams – mixed recycling, general waste and food waste. We are on 65% for event day recycling. The soil from our pitch renovations all goes to local parks."

"We are committed to achieving ISO20121 and we hope to achieve it by October this year."

She said the FA's energy bill in 2017 was £3.5 million and although some savings have already been made, it was looking to reduce those costs by a further 10-15%.

Solar panels at **St George's Park** provide 80% of the centre's energy needs on a sunny day and 10% on other days.

MELBOURNE CRICKET GROUND

On the other side of the world at the **Melbourne Cricket Ground (MCG)** in Australia, a number of sustainable initiatives have been implemented.

Ongoing upgrades and efforts in water conservation, environmental protection, energy efficiency and waste management have significantly improved the stadium's green credentials.

Peter Wearne, General Manager – Facilities, **Melbourne Cricket Club (MCC)**,

told PS&AM that since 2012 the MCC has operated Victoria's largest underground water recycling facility.

More than 180 million litres of recycled water is produced each year, reducing the MCC's use of potable water by 50%. The water is primarily re-used as irrigation in Yarra Park, the heritage-listed parkland that surrounds the stadium, and for cleaning and toilet flushing at the 'G.

Wearne said: *"Not every venue will be able to implement something of this scale, but even smaller actions such as water efficient hoses and nozzles for venue cleaning and window washing can make a tangible difference to savings."*

As host of more than 90 major sporting events and 3.5 million visitors annually, the MCC unsurprisingly produces a lot of rubbish – in 2017 alone the stadium processed more than 2,200 tonnes of waste.

However, thanks to comprehensive waste recycling efforts, 83% of this was able to be recycled.

Wearne added: *"Our commitment to recycling is managed via strict policies regarding the materials and products allowed to be brought into the stadium, and thorough waste segregation via 20 different streams – including glass, organics, soil and turf and soft plastics."*

"Our guidelines prevent venue hirers bringing in or handing out products that cannot be recycled or taken home by patrons– we've even gone so far as to work with a club to source recyclable inflatable cheer sticks."

"We focus on the full life cycle of materials in our procurement and projects, looking at the end-of-life use for anything we bring into the venue. From installing carpets that are fully recyclable, to finding groups that will reuse any turf that has been replaced."

"In Australia our wage and labour overheads are also quite a lot higher than in say the US, so throwing more manpower at tasks like rubbish sorting isn't a sustainable solution. For that reason we work really hard at educating and working collaboratively with cleaners, caterers and suppliers to ensure everyone understands the processes."

Wearne said that recently the MCC has closed the loop on organics recycling, with waste produced at the MCC treated in-house in a Gaia dehydrator and turned into a soil additive that is being used to sustain Yarra Park.

Since November close to 30 tonnes of organics material has been processed through the machinery.

"The project is really a win, win, win; it repurposes waste and avoids CO2 emissions associated with transportation, financially the costs will be recouped in operational savings and environmentally it is helping build the soil profile and sustain the health of Yarra Park long-term," he added. >>

« ENERGY SAVING

Wearne said that unless you are a very new venue one of the key challenges to deal with is ageing infrastructure and technology.

For that reason the MCC partnered with **Siemens** to deliver an Energy Performance Contract (EPC) project to improve energy efficiency at the stadium.

This drove the upgrade of existing practices as well as the installation of innovative efficiency systems to cut water use, reduce carbon emissions and generate utility cost savings.

In the first two years of implementation the project has exceeded expectations: saving 10 million kWh, achieving savings of 24% off previous (baseline) annual electricity consumption, cutting Co2 equivalent carbon emissions at the MCG by 21,000 tonnes and cutting utility costs by more than A\$1.5 million.

He added: *“These results reinforce the fact that even small changes such as swapping older light fittings for LED technology, installing dual flush toilets and low flow taps in bathrooms can make a significant difference.*

“We’ve also recently done work with Schneider Electric and AZZO to allow us to monitor costs and usage of electricity, gas and water in real-time. Our experience has been that if you can’t measure or see your performance, then it is a lot harder to determine a baseline from which to improve.

“Certainly it isn’t about finding the cheapest product nowadays – key consideration must be given to how much it costs to run, how sustainable it is.

“As opposed to just buying carbon credits to offset the stadium, we are actively working to reduce our energy consumption.

“We’ve done detailed feasibility studies looking at solar power and panels but at this point in time our research shows us

that it isn’t a workable solution for the ‘G. We are making great inroads with a focus on reducing consumption and that remains our best approach at this point in time.”

AN OPERATOR’S PERSPECTIVE

Venue management company **Spectra** currently operates over 150 venues around the world, primarily in the US and Canada, but it also manages the **Singapore Sports Hub** in Singapore.

Michael Ahearn, the company’s Senior Vice President of Operations, told *PS&AM* about Spectra’s sustainability initiatives.

He said: *“We have a programme called Step Up which is an environmental and sustainability practices guideline that we issue to all of our facilities. We try to educate our staff and the client about environmentally friendly opportunities to invest in which will reduce the carbon footprint, and we believe in most instances reduce operating costs.*

“So whenever we look at an opportunity we run financial numbers looking at the ROI, making sure we can create both a sustainability argument as to why the programme makes sense but also the business argument why it makes sense.”

Ahearn said 18 of Spectra’s venues have converted over from metal halide lighting to LEDs with another eight set to make the change this year.

Spectra has also taken a stand on chemicals and has implemented a cleaning system called Orbio at a number of its venues.

Ahearn said: *“Orbio takes regular tap water, runs it through a softener and*

Water recycling plant at the MCG

creates an ionised cleaning solution. We have been able to replace all our cleaning chemicals for windows, disinfectants, neutral cleaners with ionised water to clean the building and disinfect the building.

"It's safer for employees, it simplifies the cleaning process and it's better for the environment."

WELLS FARGO CENTER

Spectra has employed a host of sustainability measures at the **Wells Fargo Center** in Philadelphia, Pennsylvania, home of the **NHL's Philadelphia Flyers** and the **NBA's Philadelphia 76ers**.

Ahearn said: *"Right from the beginning we had our eye on sustainable efforts. The engineers installed thermal ice storage. We have a large room filled with water and we freeze it overnight when demand on the utility grid is low and rates are low. We use that frozen block of ice during the day to pre-cool the building. It reduces the*

stress and demands on the utility grid and also saves us money by using a cheaper electricity source, rather than during the day when demand is high."

Cardboard, glass, aluminum and other paper products are all recycled, while a composting programme has also been put in place.

"The concessionaire switched over all their disposable to compostable products, so all the plates, cups, forks and knives were all compostable."

As well as implementing the Orbio system at Wells Fargo Center, a hydro scrubber is used to wash down the seating bowl and recapture the water, saving 30% in water usage.

Metal halide lighting has also been changed over to LED.

There were over 300 fixed metal halides that were used to light the building for basketball, hockey and other sports as well as to light the bowl itself just for entry and exit purposes.

Ahearn said: *"We were able to do the change up and because the building is used for both hockey and basketball, we ended up putting in about 340 new LED lighting fixtures."*

FEATURE GOING GREEN!

"We probably could have done that with less but we wanted to serve both of our clients appropriately so we have certain fixtures that are only used during hockey and some that only used for basketball."

"We ended up spending just over \$450,000 and with rebates from the energy company it came close to about \$400,000 in terms of the cost to do the programme."

"But we're seeing savings of over \$150,000 annually in utility costs. It really had a payback of less than three years for that investment."

"We're constantly looking at technologies and new partners in the industry to really improve our performance, to increase our client satisfaction, reduce our operating costs, while at the same time maintaining focus on sustainable and environmentally responsible practices. That's really what we believe and we try to get that message across to all of our venues and all of our operators." ■



RAISING THE ROOF

Cost-efficient and high-performance roofs are at the heart of modern stadium design.

Stadium roofs have evolved over the years to become a holistically designed element within an overall stadium performance system.

Advances in technology mean roofs are becoming lighter and better performing, while innovative construction techniques are also developing and helping to lower costs.

The stadium roof is also becoming multi-functional with the ability to support video screens and photovoltaic panels, while it can also generate revenue through naming rights and other activities.

Structural engineers are at the heart of the roof design process and Peter Ayres, Director Buildings + Places at **AECOM** told *PS&AM* that the two main aspects when designing a roof are performance and cost efficiency.

He said: *"I think you have to start by considering what are the performance criteria that you want to achieve out of the finished roof. We need to consider it as a holistically designed moderating device that operates with all the other passive and active systems in the*

stadium to create a comfortable environment, particularly when we're looking at working in very hot or cold countries.

"We're increasingly trying to create more sophisticated environments and the roof is almost part of a machine for creating a micro-environment to optimise conditions for players and spectators.

"What do you really want to achieve. Is it about keeping the rain off? Is it about keeping the sun off? Is it about acoustics? How do you deal with turf growth? All those issues are part of the initial questioning that one has to do before even thinking about what's the most efficient form of the roof."

Mark Waggoner, a Principal at **Walter P Moore** who has been working on the **Los Angeles Stadium and Entertainment District** at Hollywood Park for the last two years, which will become home to the **NFL's Los Angeles Rams** and the **Los Angeles Chargers**, agrees.

He said: *"With the roof itself you have the ability to design the environment*

below. With any roof you start with the idea of what is the purpose of the roof? What's important? Is it game certainty, shading...all of those kinds of questions. Out of that, you arrive at some basic ideas about the roof. How much does it cover? Is it a full roof or over the seating only? What environment are we in? Is it a hot environment or a cool environment? Will we have heavy snow, high winds all those things?

"These days we are seeing a lot of use of the roof as basically an environmental design filter for creating the spectator environment below."

TURF GROWTH

Ayres said that from a roof design perspective, one main issue is about getting enough solar radiation onto the pitch to maintain healthy grass without excessive use of grow lights.

"We run our models very early on and we calculate exactly how much solar radiation month by month through the year we will get onto the pitch. That is the really fundamental starting point



for us. It affects how we orientate the stadium and what the roof needs to be in terms of giving yourself a fighting chance of maintaining the turf.

"We then have to balance against how we provide a protected environment, whether that be against heat, cold, rain or for acoustics to make everybody comfortable inside the venue."

Ayres said another key consideration is to look at what the actual operational use of the stadium will be because that can affect the shaping of the roof aperture.

"So for example if you know that you will only ever use the facility after a certain time of day, you can take that into account in any design."

"In the Middle East they generally only ever play football in the evening because it's too hot in the day and so if you know that you can design more effectively."

"The other thing to ask is what does a day in the life of the stadium look like from when you get up in the morning to when you shut it down late at night. At what times is it going to be in use and

when events are likely to take place? What is the profile of events?"

Retractable or adaptable roofs are increasingly being used as a technical solution to overcome some of the challenges.

Ayres added: *"Ideally we would never do a retractable roof if we didn't need to because clearly they are more expensive and they also have operational costs that go with them. But in very large stadia that want to have a lot of flexible use, they do become a way to overcome and mitigate some of the conflicts that you get between providing a protected environment and providing good conditions for pitch growth, which is this old perpetual conflict."*

"So we've been looking at stadiums where even though we might not have a retractable roof over the pitch we might have a retractable roof at the south end so that the sun can come in and keep the pitch growing but then you close it just for the event. That is obviously more cost efficient as well if you're just enclosing one end."

Waggoner added: *"We're seeing a move towards micro-operability, where instead of moving large sections of the roof, you open up more smaller sections."*

COST EFFICIENCY

Ayres said another important aspect of the engineering of a roof is how to make it cost effective and efficient.

"Our starting point when we design a large stadium roof is to recognise that most of the cost in a roof is not in the materials but in how you build it. So the pure material costs - the steel work in a roof - is probably less than 40% of the real cost of the roof when you take into account fabrication costs, transportation costs, erection costs, temporary works, craneage and all those other things. Also the way you build it can massively affect the programme in terms of other activities taking place on site."

Ayres has recently been involved with the engineering for the **Al Wakrah Stadium** in Qatar and on the new grandstand for the Curragh racecourse in Ireland.

"We're also working on a new stadium for the Africa Cup of Nations in Cameroon - the Japoma Sports Complex in Douala which is a 50,000 seat stadium being built for the 2019 Cup of Nations."

"It's well advanced on site. The concrete bowl is nearly finished and we're about to start lifting steel work very soon. All of the steel is imported from Turkey, the concrete is all manufactured on site using local materials."

"In that case it's a totally modular cantilever roof designed for the climate there. Being in Cameroon there was very little equipment available to us locally, so we had to import most of the craneage from Turkey where the contractors are based. The starting point on the project was what cranes can we get on a ship to take to Cameroon? What does that allow us to lift? How do we design a structure that can work within the limits of that lift?"

"So our starting point was to draw a cross-section and look at where we could put the craneage. It's actually a very elegant, simple modular system to suit that craneage."

The design of the **Japoma Stadium** is enriched by Cameroonian culture and is based on appropriate technologies, stadium functionality and tailored for the local community. The design has been distilled to concentrate on what really matters- resulting in a low maintenance, economically sustainable, easy-to-navigate venue.

WORLD RECORD

Waggoner, meanwhile, said the LA project will see the largest ETFE stadium roof in the world being built. It will cover 1.2 million ft² overall and is about twice the size of a normal NFL stadium.

He said: *"It's a roof that's open so the air can blow in around the sides of the building and yet we have this transparent cover over the top, really for game and event certainty within the stadium."*

"It's sunny in LA, so that you worry about spectators becoming too warm below. There was a fairly extensive process of CFD modelling and determination of properties of the roof system, as well as some micro operability - having small elements >>

« of the roof that open to vent out hot air - that went into the design.

"Size is also certainly a challenge – how do you fit building something of that scale into the scheduled time frame and sequencing? Outside of the seismic challenges in LA, much of the design was about figuring out the various activities of erecting the roof."

The stadium will open in 2020 and Waggoner said the seating bowl structure is already about 80% complete with roof construction starting.

"The roof columns are 20% done and we'll start steel erection in September. It is a very lightweight roof. Because of the seismic demands - there is an active fault 1/2 km to the east of the stadium - we wanted to keep things as

light as possible. It will be the largest cable roof in North America. It's a two-way cable net system, which is sort of a rediscovery in the U.S.

"The U.S. market has been resistant to cable structures for the last couple of decades and we're starting to see that resistance fade and construction managers in the U.S. realize the benefits of lightweight construction." he added.

Waggoner also said architects and engineers are seeing a lot of development in the area of transparency.

"ETFE is great, but it has its limitations in strength and solar performance. We expect to see a new generation of transparent membranes come into the market in the near future, similar to ETFE but with much better strength and

greater ability to customize the solar performance, more like the options available now in glass.

"There are also variations on traditional PTFE coated fibreglass. We worked with a version for the Minnesota United MLS project, Allianz Field. It was a custom membrane designed to achieve certain colour and light transmission.

"There are even some materials - maybe three or four years away - that have switchable technology where there are nano-particles that will block the infrared wavelengths from coming in during the day. Once the temperature cools to a certain level the particle will switch and let the heat out at night - smart membranes if you will. There are some real game-changing material technologies coming." ■



Los Angeles Stadium Entertainment District
Image credit: HK5

NEW YELLOPARK STADIUM

FC Nantes' planned new 40,000 **YelloPark Stadium**, designed by **Atelier Tom Sheehan & Partenaires** and **HKS**, includes a fixed and a retractable roof to improve comfort and optimise the carbon footprint of the venue.

The roof is composed of two parts: a fixed 25,500m² roof and a retractable central 12,000m² oculus. The system provides shelter to all spectators in the event of bad weather, while the retractable oculus is designed to optimise natural light and ventilation for the pitch and reduce the use of grow lights.

Rainwater collected on the roof will be reused in the stadium or returned to the water table.

Tom Sheehan told *PS&AM*: *"The client wanted to have a retractable roof to ensure that the very closest seats to the pitch would be protected from rain. We started working on an oculus which was just above the pitch to ensure the maximum amount of protection with the smallest opening possible."*

"The oculus is absolutely enormous. It's 125m in diameter. The reason for that was to say this isn't about something that's closed, it's about something that's open and it's got to be as big as possible to ensure that on non-match days you get a maximum amount of sun and wind and rain on the pitch."

The oculus will also be used to support a 360 degree video screen.



An artist's impression of Yellopark Stadium



TUNNEL VISION

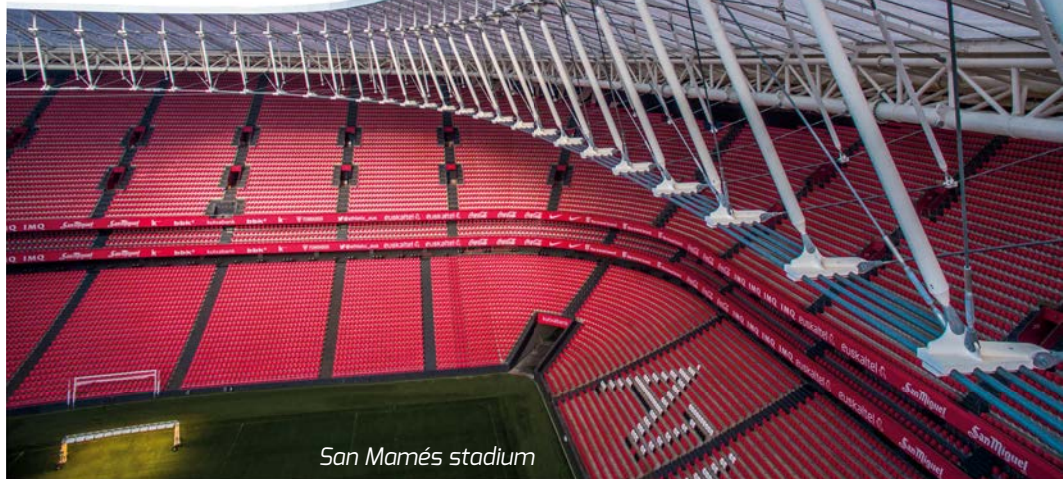
Wind engineers are sometimes asked “when do you get involved in a project?” “Too late” is often the answer, as Robin Stanfield, Head of Client Management at BMT explains.

Typically, when brought on board to support a stadium design, everything is fixed: site location, orientation, architecture, structural system, environmental control system. Interestingly, the one fundamental contribution that we can make as wind engineers is our input to the design loading scenarios for the structural system, and principally the roof. The major factor that wind-driven roof loading impacts is the steel tonnage, and thus cost, yet ironically wind loads are predominantly derived once the design is significantly advanced and the opportunity to optimise wind loads and considerably reduce costs has passed. Geography dictates the strength of climate the stadium will be subjected to. Surroundings and exposure drive the susceptibility to strong and prevailing winds, and the gustiness of winds as they reach the site. Orientation and architecture govern how the wind interacts aerodynamically with the stadium itself, where the wind pounds against the facades in a storm and where they pull up against the weight of the roof. The choice of structural system controls whether the roof’s dynamic response to the wind – its movement under various loading patterns – amplifies the aerodynamic loading by as little as 10%, or well over 50%.

If considered at the front of the design process, the choice of orientation, architecture and structural system could play a considerable role in optimising the wind loading performance and give rise to substantial savings.

PROVEN TESTING

One project BMT has been involved with is **Athletic Bilbao’s** 55,000-seater football stadium in Bilbao, Spain, where wind and rain were causing problems for spectators. In collaboration with the **San Mamés stadium** designers, BMT was able to show the value of a deeper



San Mamés stadium

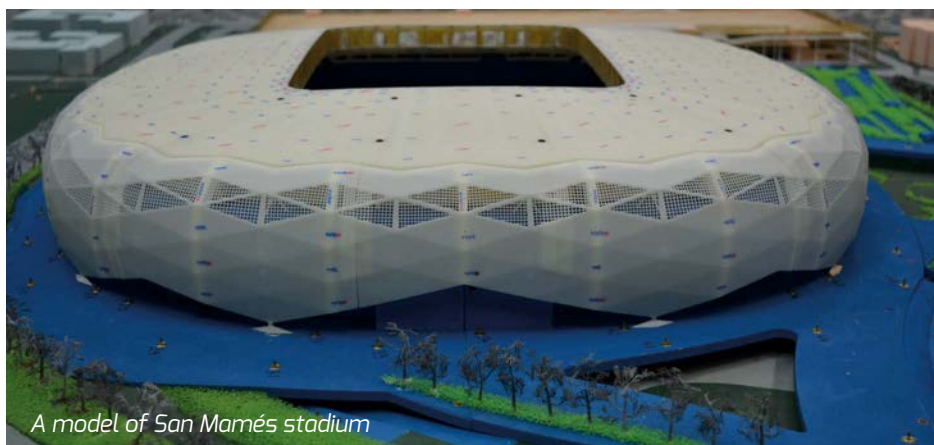
understanding of how rain can be blown around and into a stadium, by carrying out a series of wind tunnel tests and CFD simulations. The designers’ final choice of solution, an extension to the stadium’s roof, is understood to have improved spectator comfort by up to 70%.

BMT’s more recent stadia work has focused on venues with very enclosed and significant roof coverage, such as the **2022 FIFA World Cup** venues in Qatar, as designers attempt to defy the torrid heat of the region, to keep the hot outside-air out and the cool interior-air in.

Together the impact of these factors cannot be underestimated, but generally speaking, in the early stages of design, some of them sometimes are. BMT seek to change that.

SUCCESSFUL INNOVATIONS

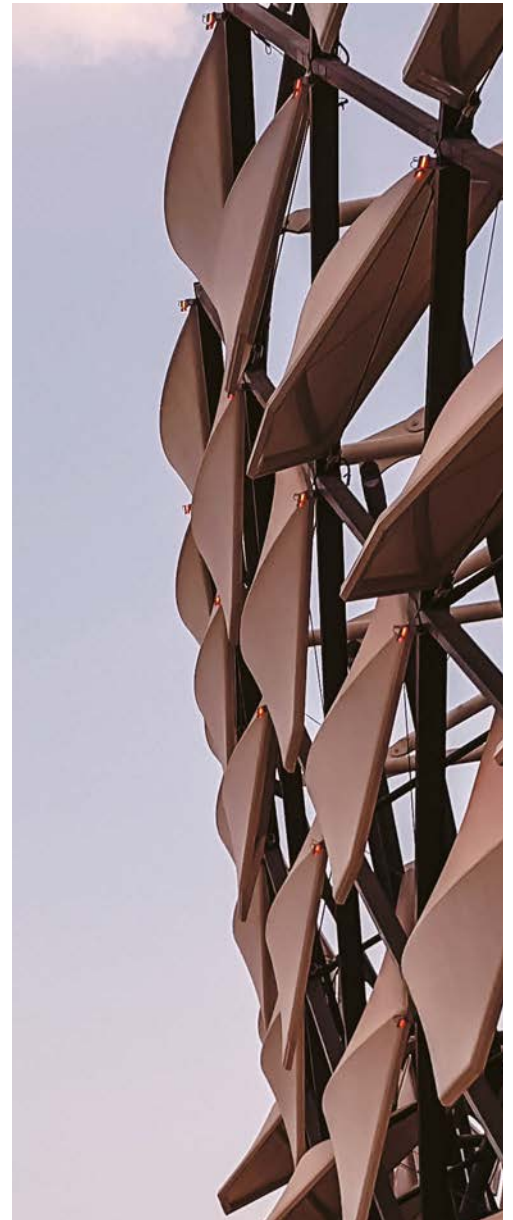
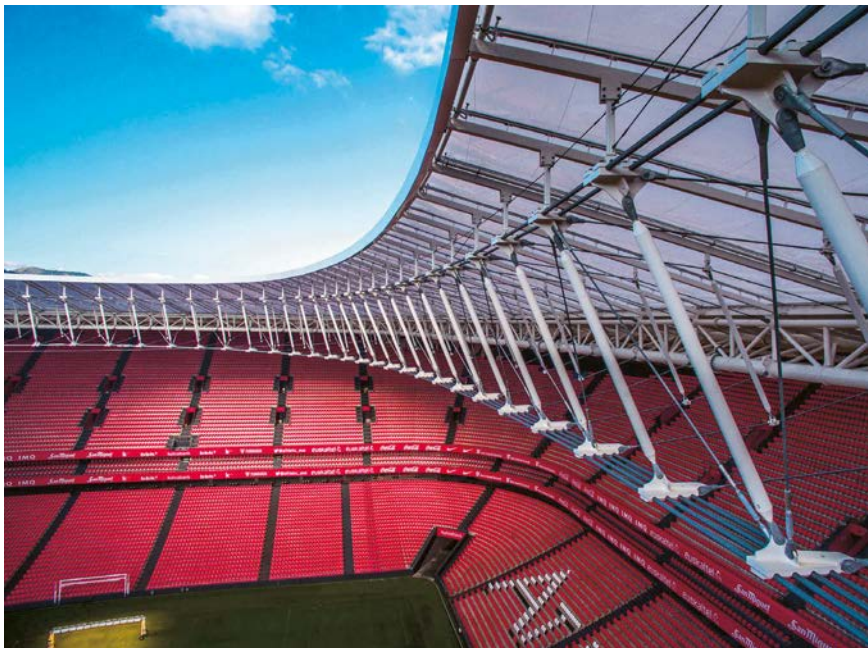
One way of doing this is through BMT’s successful and innovative wind loading workshops for super-tall towers, which have shown that wind loads can be reduced by up to 40% versus the architect’s original design. These workshops are interactive sessions where we derive a complete set of baseline wind loads, and examine the results before adapting the model, and repeating the measurements. Upwards of 10 iterations of the geometry in a single session can be accomplished. The same can be achieved for stadia and would inform designers of the options they have to optimise the design to reduce the steel tonnage costs. As fast, robust and informative a solution cannot presently be found via CFD modelling or elsewhere. ■



A model of San Mamés stadium

BMT employs a highly qualified team of aerodynamicists and wind engineers, operates three world class wind tunnels and has collaborated with some of the most iconic stadium designers over several decades.

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OLYMPIC RENAISSANCE

A new roof for Montreal's Olympic Stadium will give the iconic venue a new lease of life.

Montreal's iconic **Olympic Stadium** is set to get a new roof by 2023 as part of efforts to continue to attract major sporting and other live events to the Canadian city.

A new fixed but flexible roof would ensure that the venue could stage large-scale events all year round, including matches in the **2026 FIFA World Cup**, which will be held in Canada, the US and Mexico.

The Olympic Stadium is the largest indoor arena in Quebec with 56,000 seats, expandable to 60,000 and since its inauguration for the **Olympic Games** in 1976, nearly 66 million people have visited it.

Designed by French architect Roger Taillibert, the Montreal Olympic Stadium's first retractable roof, installed in April 1987, lasted 11 years while the current fixed roof, which was installed in 1998, is now at the end of its lifespan.

Cédric Essiminy, Director of Public Relations for the Olympic Park told *P5&AM*: *"The roof we have right now is going to be 20 years old next year, which was its originally anticipated lifespan."*

"Even though we have had problems with it, we were able to maintain it to its original life expectancy. We have staged every conceivable event here over the past 40 plus years. We have had soccer,

baseball, Canadian Football, monster trucks, Michael Jackson and even the Pope has visited. The stadium is also a popular spot for film shoots.

"What distinguishes this stadium from others is that everything can be done here. There have been many memorable moments since the 1976 Olympics and many more are added each year."

The Olympic Park is also a hub for elite Canadian athletes, while the unique 165m tower which rises at a 45 degree angle above the stadium has recently been leased to a bank for office space for 1,000 workers.

The stadium itself has been classed as having architectural, historical, emblematic and urban significance.

To keep the facility up to date, the management decided in 2012 to change the roof and the government has approved the works.

Essiminy added: *"We're putting on the new roof because our mission is to preserve, maintain and exploit the facility. Because it creates revenues it needs to be taken care of."*

"We had to prove to the government and the public that having a stadium like this in a city like Montreal is an advantage. It's important to have something like this if we want to attract big events. We are Olympic so when we do something we have to do it at the Olympic level."



He said the addition of the new roof will help Montreal continue to attract world class events such as the **Formula 1 Grand Prix** and **Montreal Jazz Festival** which it already stages.

TIMELINE

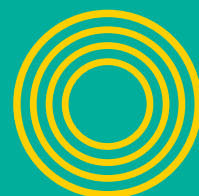
The current schedule of works will see the old roof removed in the spring/summer of 2022. The stadium would remain without a roof over the winter of 2022-23 before a new roof is installed in the spring of 2023.

Essiminy added that the stadium would be winterised during the time it was without a roof. *"We can take advantage of the period when the stadium is without a roof to host outdoor events such as the classic NHL game that's held each January. That's one of many possibilities."*

"We can use the fact that the stadium will have no roof for a few months to our benefit to host sporting events that need to be held in the open."

And he said that the new roof would form part of a major upgrade of the whole stadium.

"With the new roof there are going to be other investments in new seats, new lighting, new sound. We're planning on an upgrade of everything and the roof is just a part of that." ■



MONTREAL
OLYMPIC
PARK
THE STADIUM

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Discover past and upcoming events and artists at the Olympic Park, including: an edgy pop singer, a Latin superstar, a famous family of singers, an orchestra conductor, an ancient Egyptian opera singer, an auto show, a dirt bike event, a team of gymnasts, a Hollywood film shoot and a visit from the pope.

To find out more about the Olympic Park and its lineup of indoor and outdoor events, visit parcolympique.ca/en/plan-your-event

A CHANGING ART

In the world of stadium design, structural engineers face some of their greatest challenges. Stadium designer and structural engineer Peter Ayres of AECOM goes back to his roots to ask whether such demands are actually changing the nature of his profession.

The first stadium project I ever worked on was the **Sheffield Arena** in the 1980s.

I well remember block booking my department's only computer terminal (then linked to a main frame) for weekends so I could come in and run my analyses overnight.

I think, at the time, I was the only person in our firm ever to have used the programme's full 3D capability.

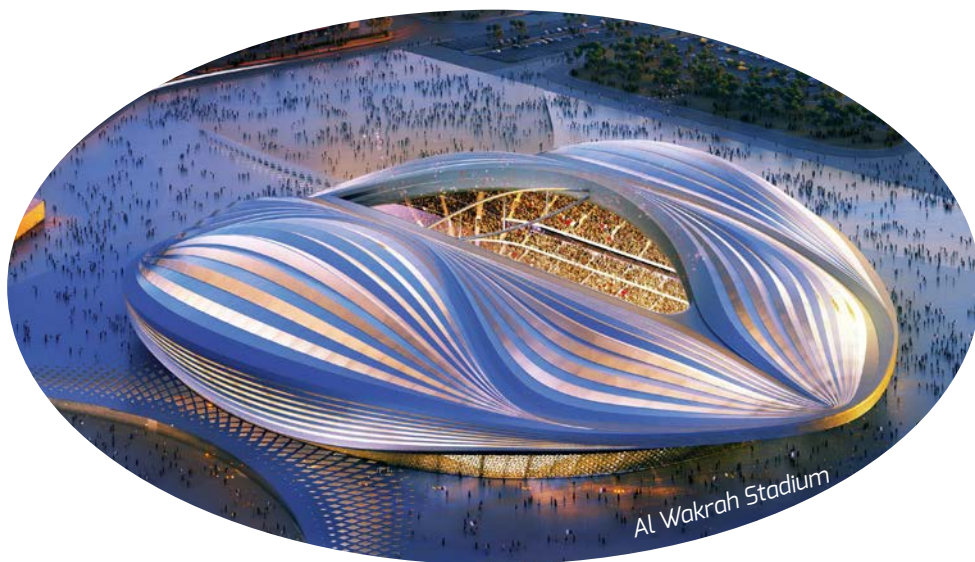
How things have changed! The speed and refinement with which today's engineers can use technology to design ever more complex and high performing structures is remarkable. Which begs the question, as structural engineers, what do we really mean by design?

When I was at university over 30 years ago, much of our course work was taken up learning the hard, number crunching ways of analysing structures, whilst "design" lessons generally involved practicing the use of codes and standards.

For the 21st century structural engineer, many of these processes can now be almost entirely automated. It remains crucial to master basic principles, but real added value comes in understanding when and how to apply the increasingly complex tools at our disposal to deliver more creative solutions to our clients and stakeholders.

At a fundamental level, I firmly believe that structural design is about ideas, not numbers. But technology allows us to push the boundaries and improve efficiencies in many ways. One of the most obvious manifestations of this is in generating complex geometrical forms. Frei Otto's genius was to use nature as his inspiration, harnessing geometrical shapes though physical modelling of soap bubbles and spiders' webs to produce wonders such as the Munich Olympic venues.

But whilst such pure geometries create theoretically optimised structures in



terms of material use, the reality is that performance is driven by a huge range of other factors, not least of which is constructability (the first question we ask ourselves when coming up with a long span roof concept is "what will it look like half built?").

PARAMETRIC DESIGN

Today, we use parametric design techniques to generate computer models which allow us to rapidly test and refine every aspect of the project at every stage of construction and operation.

The principles of parametric design are simple; instead of defining elements in a structure by precise properties or Cartesian co-ordinates, we create a network of algorithms which governs the relationships between the various parameters defining those elements.

This allows us to introduce multiple variables and to rapidly prototype a huge number of iterations to help us optimise overall performance.

Parametric design allows us to be more creative than ever, opening up possibilities for engineers to "play" in a digital world where we can "bend" nature and still develop beautiful shapes which can be geometrically defined.

The result can be striking, such as in the new **Al Wakrah Stadium** in Qatar designed by **AECOM** in collaboration with **Zaha Hadid**, modelled on the shape a traditional Qatari dhow, but parametrically optimised for structural efficiency, connection simplicity, standardisation of elements, microclimate performance and constructability.

So what will the structural engineer of the future look like? The left brained skills I was taught at university can be almost entirely automated now, so she probably doesn't look like me! We need to free the left brain of repetitive tasks so it can reach its peak in applying critical focus into the brilliant ideas of the right brain.

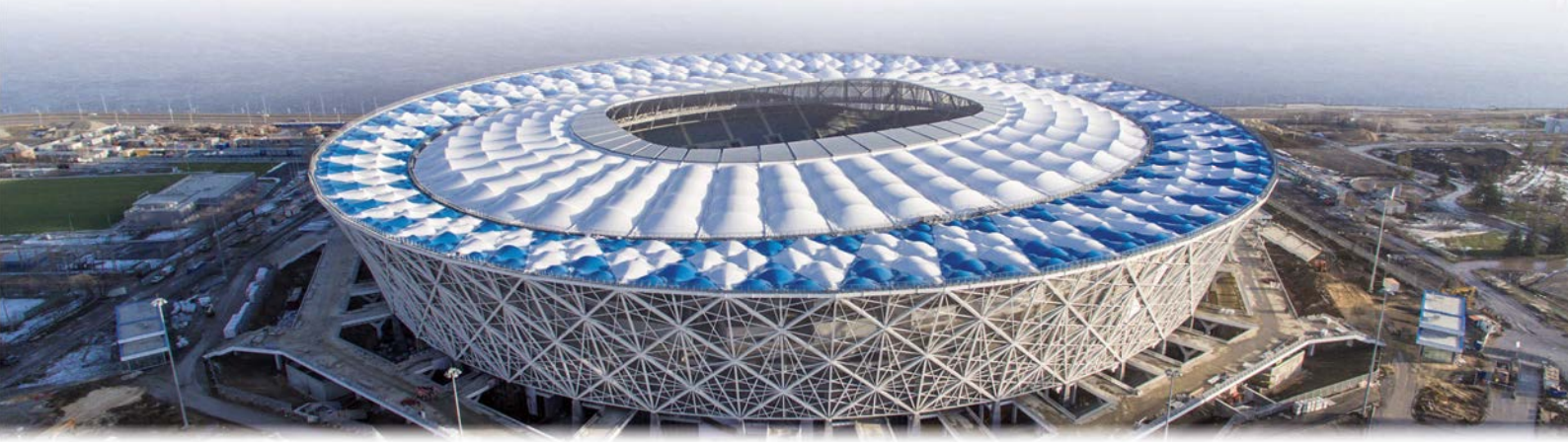
We need people who can conceive an idea, communicate it, and then work our digital tools. They might not even have traditional engineering degrees.

But they will have the right sort of enquiring, creative minds. And they will be drawn from the best talent around the world. It is a tough challenge to find such people, but luckily for us, in stadium design, we work in one of the most appealing sectors in our industry. As long as sport has the power to thrill, I am sure we will attract the right talent. ■

FLYING COLOURS

FEATURE
ROOFING

Low & Bonar GmbH developed a specific blue type of membrane for the roof of the Volgograd Arena to reflect the colours of FC Rotor Volgograd.



Volgograd Arena was built at the foot of the Mamayev Kurgan memorial complex, near the Volga River. It lies north of the city that has over a million inhabitants.

The stadium has a basic oval shape and a capacity of around 45,000 spectators.

German **gmp architects** from Berlin developed the geometry of the grandstand bowl with rows of seating arranged in parallel to the edge of the pitch.

This way all spectators have favourable viewing conditions. The straightforward geometry facilitates the use of prefabricated concrete elements in construction and an efficient organisation of the functional areas.

Apart from being a venue for several group games in the **2018 World Cup**, Volgograd Arena will host **FC Rotor Volgograd** in the future.

When gmp was commissioned with the design of Volgograd arena they teamed up with **sbp Schlaich Bergermann Partner** engineers from Stuttgart for the structural design.

Many venues worldwide are the result of a successful teamwork between these two experts.

Facade, roof and bowl have been designed as three independent structural systems. The grandstand areas have a roof of a lightweight tensile structure.

According to gmp architects, the facade creates a symbolic analogy with the Russian art of weaving and braiding. It features an eye-catching polygonal,

seemingly woven texture. As in the roof there is a rhombic structure.

Project institute ARENA, an architects' office that was founded in 2011, coordinated the planning process and was responsible for the execution work during implementation while the stadium was built.

The engineering part of the roof execution planning was monitored by the Russian branch of **Maffei Engineering**.

The upper cover is composed of blue and white rhombi consisting of membranes made in Germany.

Low & Bonar GmbH provided more than 80,000m² of technical textiles in two colours. As in many other sport venues around the world, the roof adds to the eye-catching venue as a whole.

Nowadays we are used to television pictures illustrating not only what is happening on the pitch but starring the venue itself at the same time.

Photos taken with a helicopter camera highlight the roof as an important design feature – meant to embed this specific stadium in the public memory and essentially putting the venue and its location on the map.

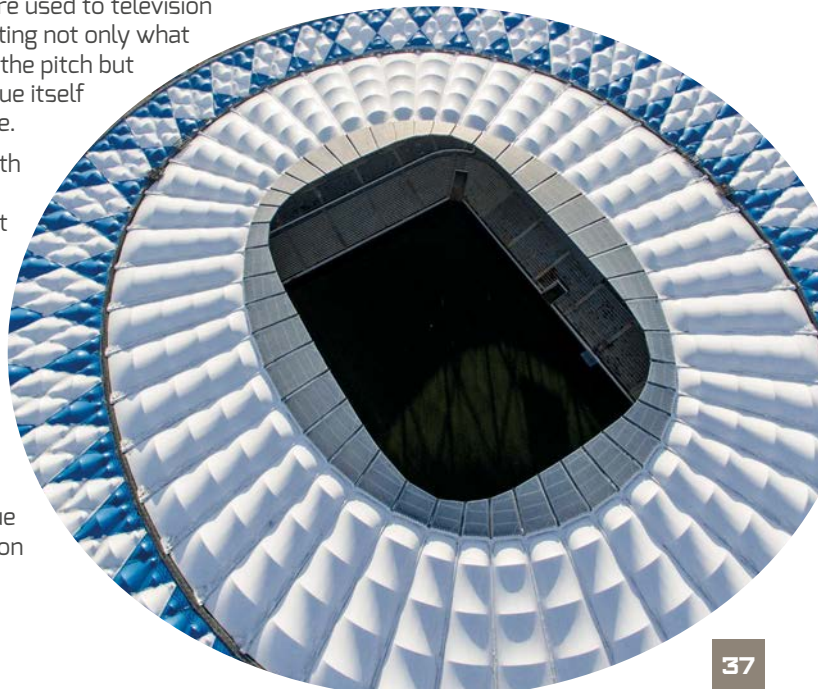
Hence Volgograd Arena and the “The Motherland Calls” statue as its direct neighbour tell the city’s story of the past and the present.

Low & Bonar GmbH developed a specific blue type of membrane which features the colours of the club which is to take over the stadium after the **FIFA World Cup**.

By chance the club’s blue and white rhombi are very similar to the Bavarian flag in Southern Germany.

An international public knows the light blue and white emblem from the Oktoberfest in Munich.

There might even be the opportunity to strengthen the Russian/German relationship with an Oktoberfest party in the newly built Volgograd Arena. ■



NEXT GENERATION FACADE LEADS THE WAY

All images courtesy of Populous



Walter P Moore's Justin Barton and Marty Augustyniak explain how a new material has been developed to provide a stunning façade for Allianz Field.

Allianz is a name paralleled with high design, sustainability, and engineering ingenuity.

The Allianz family of stadiums boasts state-of-the-art facilities that currently span six countries and three continents.

Minnesota United FC, which entered **Major League Soccer (MLS)** in 2017, will introduce **Allianz Field** to the league in 2019.

MLS is growing rapidly across North America. A key factor in that growth is the development of soccer-specific stadiums providing a one-of-a-kind gameday experience for fans of all ages.

Minnesota United FC sought to create an iconic stadium that would be instantly recognisable and an integral part of the club's identity.

Specifically, the owner desired a stadium whose exterior skin was as dynamic and intricate as the action on the pitch.

To create the iconic façade, the owner challenged the design team to find a cladding material

that provides appropriate weather protection in the often-harsh Minnesota wind and rain while also creating a distinctive and elegant look.

The owner, and design architect **Populous**, envisioned cladding that can be coloured, backlit, and transparent enough to visually connect fans outside the stadium to the energy being generated within.

The challenge was that no existing cladding material provided this combination of characteristics and properties.

NEW FABRIC

Walter P Moore overcame this void by collaborating with several membrane suppliers to identify appropriate materials and then worked with the preferred manufacturer to develop an entirely new product that achieved the owner's vision.

Walter P Moore's material specialists collaborated with **Saint-Gobain** — the world's leading producer of engineered,

high-performance polymer products — to refine the material to meet the project's specific requirements.

The result was a new type of fabric containing an open weave of fiberglass yarns that provide strength, tear resistance, and serve as a platform to hold colour.

The fiberglass weave is laminated with clear polytetrafluoroethylene (PTFE) that makes the material weathertight and allows twice the amount of light transmission compared to traditional PTFE-coated membranes.

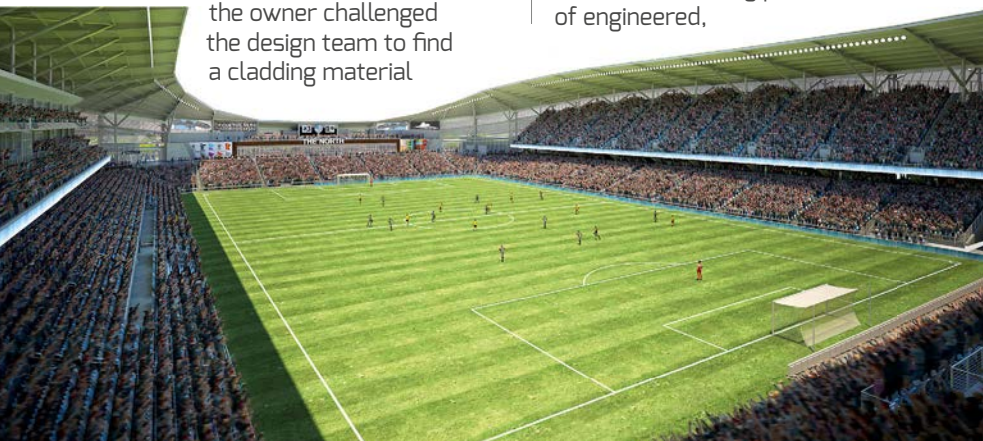
The collaboration among stadium designers and material producers was critical to having the next generation façade ready for large-scale installation.

The PTFE is supported by a series of undulating, large-diameter steel pipes encircling the stadium.

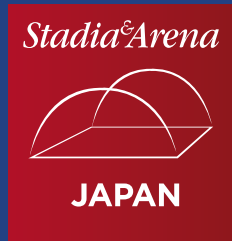
These pipes, dubbed "driver pipes," serve to "drive" the skin's complex geometry and create the supporting structure that gives the PTFE its distinctive form.

Variable LED lighting is attached to the driver pipes allowing nearly indefinite colours, themes, and lighting configurations to be displayed on the stadium skin.

When Allianz Field opens, it will fulfill the owner's and architect's vision of an emblematic stadium that is identified as the Home of Minnesota United FC and a fitting complement to the illustrious venues that carry the Allianz name across the world. ■



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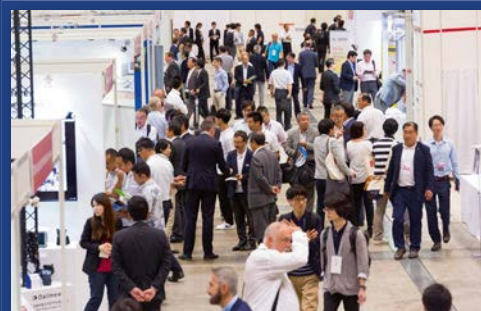
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SURROUND SOUND

Clarity, intelligibility and flexibility are key to delivering superb audio in stadia and arenas.

Large open stadia and closed-roof arenas present serious challenges for audio engineers looking to create dynamic sound.

Vocal intelligibility in large enclosed spaces is affected by long reverberation time and problems with sound reflecting off surfaces, including windows and hard seating.

In large stadia the distance between the loudspeakers and the fans present additional challenges.

Stephen Hogg, Managing Director **d&b Audiotechnik GB**, outlined the challenges of producing clear audio in a stadium.

"For the most part the issues are quite typical: high reverberation, weight loading in the roof, finding the optimum positions for loudspeakers, and the distances involved from loudspeaker to listener."

"The real challenge, or opportunity as we like to think of it, is going beyond clear intelligible sound - to really capture a venue's individual sonic character and potential. Sometimes this might mean preserving a historic echo, or adding a level of musicality for a party atmosphere."

"Ultimately the goal is to deliver audio that's easy on the ear and that feels true to the listener, enabling them to become encompassed in the atmosphere in a way that can't be replicated at home or in the pub."

John Monitto, Director of Business Development at **Meyer Sound** said the main challenge is delivering consistently high vocal intelligibility.

He said designing coverage to reduce sound spillage from outside seating areas is critical.

"I think in all cases the challenge with distributed systems is to keep them as controlled as possible."

"It's all about controlling energy and also having good dynamic range so that you can get over crowd noise when there's a high point of the game. That's one

of our other goals with these systems - that we have good intelligibility and you can hear the announcements during high crowd noise sections of the game."

Monitto said one top project Meyer Sound has worked on recently has been at the 65,000 seat **Ford Field**, home of the **NFL's Detroit Lions**.

A 178-loudspeaker Meyer Sound LEO Family linear reinforcement system was installed to provide exceptionally high speech intelligibility with uniform coverage throughout the seating bowl, while also delivering the broadband power and dynamic range required to energise fans in the stands and players on the field.

The Lions' renovation project marks the first permanent installation of a LEO Family system in any NFL stadium.

D&b's Hogg added: *"Being entertained is to be stirred emotionally, so it follows that fan engagement depends on the best sensory experience possible."*

"Audio quality is now recognised as intrinsic when integrated with lighting and video, as part of a holistic formula that's capable of taking audiences to an entirely new experiential level. d&b Soundscape technology epitomises this shift toward achieving truer, more emotive sound in venues

and outdoor spaces of all sizes and complexities."

"Whether it's used to realise more natural imaging through source positioning, or to create sound art, a work of pure imagination, it is about connecting audiences more deeply than ever before."

The increased integration between sound and video can also present challenges, as Monitto explains.

"Video sync is very important because video screens have become so large that if you have a >>>





« point source you can time it for one area of the stadium, but there's going to be parts of the stadium where the sound is going to be too early, and in other parts it's going to be too late. Distributed systems tend to win in that area because you end up with better sync.

"The CAL column array solution is probably one of the most interesting solutions that we've seen and I'd say that our particular product seems to be getting a lot of traction and is being used more and more in installations when it can be.

"The nice thing about it is that it keeps the sound very much isolated to the zone that is being covered because there's very little lobing outside of the coverage area. So that's kind of a new trend."

MULTIFUNCTIONAL VENUES

The increase in the number of stadia and arenas being used for any number of different events is also leading to demands for more flexible audio systems.

Hogg added: *"Hosting a variety of event formats demands a technical solution that is highly flexible, reliable and that delivers exceptional results every time, without any compromise to public safety. Switching between set-ups*

must be quick and simple to manage so complete controllability and integration is key.

"A d&b system offers complete audio control solutions. It is possible to switch from sports mode to evacuation mode or reset to an international concert venue at the touch of a button. d&b ArrayProcessing allows the stadium operator to provide an even audio coverage for its guests.

"ArrayProcessing also enables the creation of unique avoidance zones where the level is reduced, for dedicated media zones where commentators need to be heard above the background stadia announcements - a requirement now set in the UEFA guidelines - or for more intimate VIP areas."

One of the ultimate multi-functional venues is the **Alamodome** in San Antonio, Texas, which has recently undergone a \$60 million refurbishment.

The 65,000-seat multipurpose facility is tasked with doing it all: it's used to host football, basketball, soccer, hockey, baseball and other events. But over the years, the sound requirements for contemporary collegiate and professional sports have only increased as the venue's original sound system, installed when it opened in 1993, was close to running on empty.

As part of the renovation project to modernise the venerable venue and make it more competitive with other top North American stadiums, the City of San Antonio called upon Dallas-based technology design firm Idibri to design a new sound system that would bring the Alamodome's aural experience into the 21st century.



Idibri's primary objective was to deliver the high impact, high SPL and enhanced intelligibility now required in modern sports, including the raucous **NCAA Final Four** games, which were played there in the spring of 2018 for the first time in 20 years.

"The Alamodome is a huge venue with some very real acoustical challenges, but you still want to give every seat the same great experience," said Ray Givens, sales engineer and project manager for LD Systems, on the Alamodome sound system renovation.

"The L-Acoustics K2 lets us get excellent coverage and meet the SPL requirements of every game, including the Final Four, without sacrificing speech intelligibility."

Givens said that L-Acoustics sound systems have been gaining significant traction in sports venues in recent years, with new systems recently installed by **LD Systems** in the **AT&T Center** and **Freeman Coliseum** in San Antonio and **Toyota Center** in Houston.

"L-Acoustics is developing the same kind of reputation in sports venues as it has in live music," said Givens. *"It puts the sound right in front of the fans in the stands, no matter where they're sitting. Upper bowl or lower bowl, you don't feel like the sound is coming from some distant place. It puts you right up close."* ■



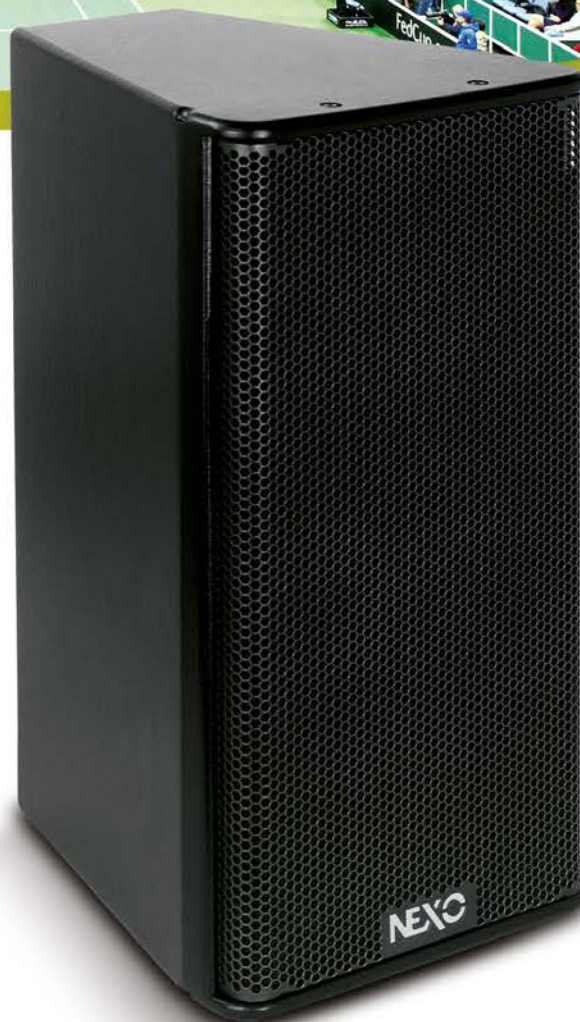
Geo
S12-ST

HIGH OUTPUT FOR LONG THROW

SOUND THAT GOES THE DISTANCE

NEXO loudspeakers deliver the high output levels necessary for long-throw applications. GEO S12-ST cabinets combine high SPL with a smooth frequency response, enhanced speech intelligibility and focussed dispersion to give system designers the performance and flexibility they need to achieve perfect crowd coverage throughout any venue.

No wonder NEXO scores big in stadium and arena environments.





OILERS AND OPERA AT ROGERS PLACE

Oilers Entertainment Group invested in a state-of-the-art sound system from d&b audiotechnik for Rogers Place.

The internal architecture of **Rogers Place** in Edmonton, Canada, resembles nothing less than an 18,000 seat version of a modern opera house.

The new home for the **National Hockey League's Edmonton Oilers Hockey Club** is open, inviting, exciting, and comfortable.

Eschewing huge uniform glass slabs, the premium seating and VIP areas are intentionally integrated within the seating bowl, while the catering and bar facilities overlook the rink so that refueling fans might never lose touch with the action on the ice.

To ensure the sound fitted with the seamless quality of the arena, **Oilers Entertainment Group** invested in a state-of-the-art sound system from **d&b audiotechnik**.

Oilers Entertainment Group's consulting team invited one of Canada's leading acoustic consultancies, **Orchestral Arts Inc. (OAI)**, to define both the extensive acoustic treatments and sound reinforcement systems.

"When an architectural drawing set for Rogers Place was presented to Orchestral Arts, some acoustical challenges became immediately apparent," commented Dale Fawcett, principal of OAI. *"Unlike arenas which position loudspeakers above and around the centre ice score clock, the main loudspeakers in this arena would need to be lowered and moved closer to the listeners."*

SOUND CONTROL

Nevertheless, the classic conundrum of a sports arena prevailed; controlling the

loudness of the reverberation. Acoustic treatments defined by OAI can be found in the entirety of Rogers Place, from the high ceiling and side walls of Ford Hall, through to the dressing rooms for players and performers.

"The extent of the acoustic treatments required principal architectural firm HOK Architects to play an instrumental role in guiding their completion through the construction processes," noted Fawcett. *"The acoustic in the bowl provides an essential environment for the d&b sound system selected."*

Fawcett used EASE acoustics simulator software to verify an installation solution founded upon 10 line arrays of d&b V-Series arranged around the seating bowl.

Specifically, the Vi8 installation version was used to shape the main arrays, with three cardioid Vi-SUBs deployed immediately behind each array, all powered by D80 amplifiers.

Delays for the upper concourse seating, fill speakers for seating immediately bordering the mid bowl dasher boards, and fills for the players and officials on the ice was accomplished using the d&b Y110P point source loudspeaker. A combination of d&b D20 and D80 amplifiers were used for the Y-Series enclosures.

"No compromise was made with respect to coverage in the higher bowl," explained Fawcett. *"Gary Urlacher, owner of Allstar, attended to installation details throughout the entire project. His team's effort was exemplary through the difficult construction process."*

Beyond the arena bowl Oilers Entertainment Group provided Orchestral Arts with detailed input lists for every room. Fawcett introduced the idea of a QSC Q-SYS solution. *"The system has more than 480 inputs and 420 outputs, and includes 1,500 distributed loudspeakers throughout the facility on many signal delays all timed off the respective d&b arrays. Dedicated Q-SYS outputs exist for each of the d&b amplifier channels."*

Noel Hynek, one of the operators of the system for all sporting events at Rogers Place, commented on the final results.

"With the arena at capacity the combination of acoustic treatment and the precise positioning and alignment of the d&b loudspeaker system means there is absolutely no slap back. That's a real help. Since the d&b team came in, the system performance has real energy," he said.

While the acoustic and sound system was designed for hockey, it is also available for touring acts. *"The bowl system has the capability to connect the d&b arrays and subwoofers to a touring system, specifically to the far end zone but also other zones,"* said Fawcett. *"With d&b included on many riders, it is hoped that this use will develop over time, and maybe even operatic events. For touring acts, an important revenue stream for the facility, the acoustic treatment in the bowl was envisioned to provide a good feel for artists and engineers first entering and then rehearsing in the space."* ■



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SINGING THE BLUES

Fans of the St Louis Blues have been blown away by the improved L-Acoustics sound system at the Scottrade Center.

The Scottrade Center is home to the National Hockey League St. Louis Blues, but the 18,724-seat arena, first opened in 1994, also hosts a range of nearly 200 events including wrestling, boxing, basketball, concerts, ice shows, family shows, graduations and more.

But like other venues of its vintage, Scottrade's original sound system was not able to keep up with the demands imposed by a wider range of applications that require comprehensive audience coverage, full-spectrum music reproduction, and excellent speech intelligibility.

It now has that capability, thanks to the implementation of an AVB-networked L-Acoustics Kara system designed by Dallas-based consultancy Idibri and installed by Logic Systems Sound and Lighting.

The new Kara system, powered by 33 AVB-equipped LA4X and one LA12X amplified controllers, consists of 90 Kara loudspeakers and 36 SB18i subwoofers, in six arrays of 15 Kara and six SB18i. In addition, six ARCS II are positioned facing straight down for ice coverage and special events.

The Kara system design provides such comprehensive coverage of the bowl's seating areas that an option to add under-balcony speakers was abandoned the first day the system was turned on. That wasn't the first surprise that this project revealed.

"Although L-Acoustics' K2 was initially specified and provided 6dB more SPL, Kara was chosen because it was able to meet actual SPL requirements and a tighter budget, allowing funds to cover more aspects of the overall renovation,

including updating the AV systems in the locker rooms," explains Ben Cating, Idibri senior consultant and project manager.

The smaller Kara boxes were still able to provide the required high degree of coverage, volume and intelligibility, allowing the budget to be stretched without any compromises.

PROJECT CHALLENGES

The project did have its challenges, but the AV integrator's expertise combined with the Kara system helped tremendously with those as well.

"The primary challenge was to place six arrays in very precise locations in a building with asymmetrical steel and a labyrinth of 10-foot-diameter steel air ducts that always seem to be in exactly the wrong place," recalls Logic Systems Sound and Lighting President Chip Self.

Kara's impressive weight-to-power ratio solved that issue. *"It was lighter, more powerful, and required substantially less power than the other systems,"* Self explains. *"Since this project included a huge new scoreboard, which weighs much more than the original, the weight saving was very valuable to the building engineers, as it did not necessitate the addition of any new steel."*

The installation faced a tight timeline, between sports seasons and other scheduled events. *"Given lead times on equipment and other elements of the construction schedule, we were not able to start our work in earnest until there were less than 60 days*

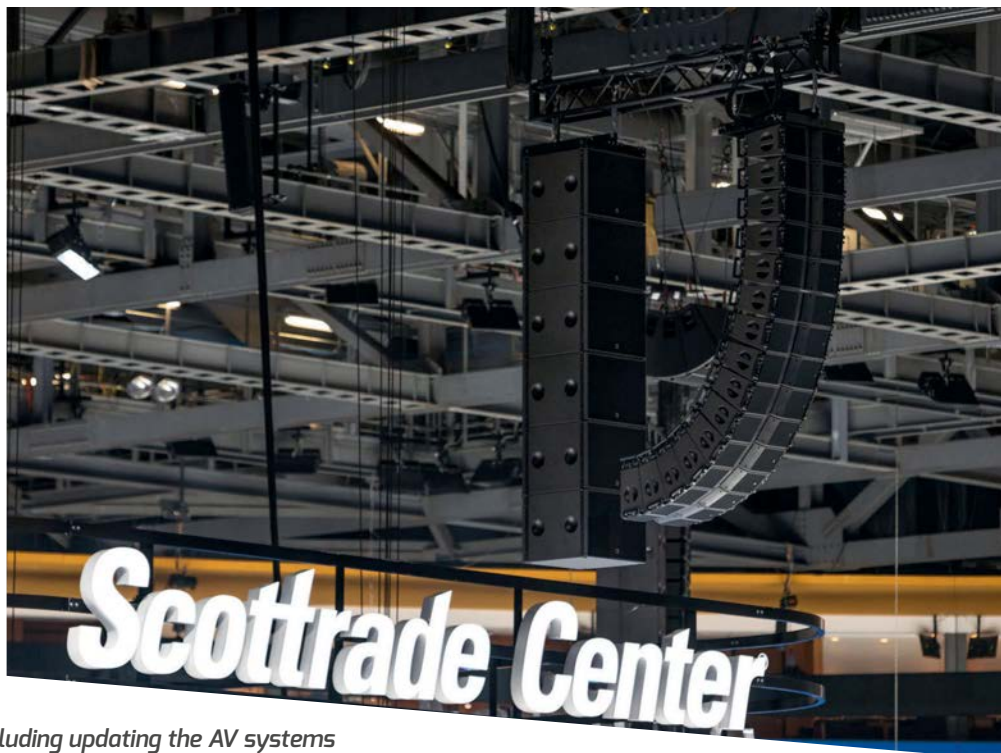
to complete the entire project," says Self. *"To compensate, we did a great deal of pre-configuration and pre-assembly off-site. That made a huge difference in getting the project complete on time, and on budget."*

All of the Kara loudspeakers were able to be hoisted into place within a single day, allowing the crews to focus on wiring and tuning the system.

"The final performance exceeds predictions," Self observes. *"If anything, I've found that L-Acoustics are conservative with predictions, which can't be said of all loudspeaker manufacturers. The intelligibility and directivity are spot-on, and there is headroom for days."*

"Last year's renovations required a high level of expertise, precision and commitment, and I can't imagine working with anyone better than Ben from Idibri, Chip from Logic Systems and the L-Acoustics team," adds Scottrade Center Group Vice President and Arena General Manager Alex Rodrigo.

"This project was our 'Mount Everest' and the team not only reached the summit, but did it in such a professional and knowledgeable way that it was an enormous amount of fun. Our fans and guests are now more engaged than ever and truly blown away by the difference that the new sound system has made. This project has dramatically improved Scottrade Center's sports and entertainment fan experience for years to come." ■





Scottrade Center - St. Louis, MO

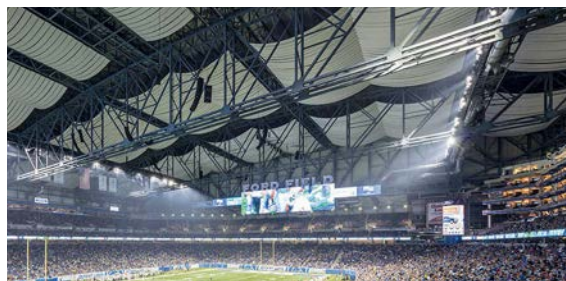


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HEAR THE LIONS ROAR



A new Meyer Sound audio system at Ford Field has improved intelligibility and boosted the fan experience.

Ford Field hosts the **National Football League's Detroit Lions** as well as many other large-scale concerts and special events.

Construction was completed in 2002, with seating for 65,000 football fans plus additional seating on the field surface for other events.

By late 2015, stadium management had determined that a complete refurbishment of stadium amenities was in order, including essentially all AV systems.

With a budget of over \$100 million and scheduled for completion in August of 2017, the project also included updates to the suites and premium club areas.

The new audio system addressed shortcomings that had plagued the original installation. Speech intelligibility and music power had suffered over the years, a situation reflected in complaints from fans in surveys and focus groups.

Coaches and front office staff complained that they could not understand officials' calls on the field. Troubleshooting the old system was problematic as there was no comprehensive, computer-based diagnostic monitoring. In addition, there was no coverage on the playing field – highly desirable to pump up players in warmups.

Rental systems were needed to cover the field for special events in the off season.

To remedy these shortcomings and boost performance to league-leading levels, stadium management

engaged the acoustical consulting firm of **Wrightson, Johnson Haddon & Williams**.

Based on their recommendations and on-site trials, the Lions' management selected a LEO Family system from **Meyer Sound** – the first in any NFL stadium. The new system possesses the wide dynamic range required to deliver clean, uncompressed and undistorted sound even during bursts of peak ambient crowd noise.

Because the voice characteristics remain clear and natural, intelligibility remains high without sounding annoyingly loud.

Extended dynamic range also enables greater flexibility in programming music and effects for climactic moments as the sound doesn't have to be heavily compressed to prevent system overload.

The main system is anchored by a distributed ring of eight LEO Family line arrays, with a total of 100 LEO and LYON self-powered loudspeakers covering most seating areas. Scoreboard delay arrays and corner fill arrays comprise an additional total of 36 LEOPARD compact linear loudspeakers.

For deep bass music and commanding special effects, 24 1100-LFC low-frequency control units are deployed as cardioid arrays to provide directional control for convincing impact both in the bowl and – when a special preset is selected – also on the playing field.

A separately addressable system of 18 LEOPARD loudspeakers blankets the playing field with high-level sound.

Outside the main bowl, in the acoustically problematic atriums at gates A and G, audio is delivered by pairs of Meyer Sound CAL column array loudspeakers with advanced beam steering technology, enabling precise control to minimise reflections from the expanses of glass and metal.

Parsons Electric of Minneapolis, Minnesota installed the audio systems in a contract that also included upgrades to the broadcast cable system as well as all back-of-house AV on concourses and in atriums.

Under a separate contract, **Daktronics** provided a video system with more than 26,000ft² of displays, including new end zone screens measuring 39.5 feet high by 152 feet wide and featuring a 13HD pixel layout for crisp imagery and wide-angle visibility.

Four additional displays measuring 13 feet high by 59 feet wide can be used individually or coordinated with the main displays for one continuous 270-foot display.

Also installed were two super column displays, three large ribbon displays along the fascia, and an additional four ribbon displays along the seating for a total of more than 5,000 linear feet of displays. ■

Exterior of Ford Field, the home of the Detroit Lions

Image credit: James R. Martin



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SOUND EXPERIENCE

PS&AM caught up with the Business Development team at HARMAN Professional Solutions, which is headed by Business Development Director Jonas Stenvinkel.

PS&AM recently visited your newly opened HARMAN Experience Centre in London and what struck us was the impressive range of different brands and solutions that were applicable for a huge range of areas within sports venues. Can you please give our readers a brief overview of these relevant solutions and which part of a sports venue they would be applicable for?

Stadia and Arenas are becoming leisure destinations as owners start to develop with a much wider scope than ever before. Outside of the sports venue there are associated retail spaces, bars and restaurants, hotels, themed attractions, convention centres, cinemas, nightlife and in some cases residential developments. These projects are becoming the heart of the regeneration of the wider local area with local governments investing in large scale transportation infrastructure to support the expected increase in visitors.

At HARMAN we have solutions that cover a range of audio, video, lighting, networked AV and control systems for all of these applications.

Within the stadia/arena space our solutions include high performance loudspeakers for the stadium bowl through to compact EN-54 compliant loudspeakers that are suitable and can be used safely in back of house areas.

In addition HARMAN can offer architectural lighting, meeting room and hospitality audio and video solutions and high-quality audio mixing systems for broadcasters.

In addition, our wide range of products from our AKG, BSS Audio, Crown, dbx, JBL Professional, Soundcraft & Studer brands, provide high quality audio solutions suited to all elements of a development.

The AMX brand combines complex networked AV and control into a user friendly package and our lighting brand Martin offers lighting solutions and media façades to emphasise and supplement the architectural design.

How important are sports venues as a target market for HARMAN and what factors are the main drivers in determining the performance of an audio solution? How does that differ between an open bowl stadium and an indoor arena? Presumably, an arena with a more diverse event calendar presents a different set of challenges from an audio perspective?

Sports venues are at the heart of HARMAN Professional. These invariably large and acoustically complex spaces require a considered, highly engineered and expertly delivered solution to ensure that the highest levels of sound quality and speech intelligibility are achieved.

The need to both deliver upon an exhilarating fan experience and critical life safety demands that the products are specifically designed for this purpose. JBL Professional, engineer and manufacture the transducers, waveguides and enclosures in-house to ensure optimal results.

In an open bowl scenario all loudspeakers must be weatherised and built to withstand extreme variations in temperature.

Our range of loudspeakers includes options for stadia and arenas of all sizes in both traditional "point-source" and "line-array" loudspeaker designs.

Products such as the JBL PD series and VLA-Compact are engineered



HARMAN Experience Centre in London

for high-output applications and are available in weatherised versions to suit either open or enclosed venues.

In the arena space many operators may, in addition to sports, host large music concerts. The installed sound system can often be needed to support the sound produced by the touring PA system, such loudspeakers often referred to as "ring-delays" are an integral part of the life safety PA/VA system but must provide excellent sound quality.

JBL loudspeakers have been used by touring artists to deliver exceptional sound to venues all around the globe.

Are you targeting the renovation of existing sports venues in addition to new builds and if yes are the challenges more complex when dealing with an old and existing infrastructure? What advice would you give to sports venue owners or operators who are currently looking to upgrade their own systems?

Many venues are seeing the daily reality of the needs of their customers change. The new revenue streams generated from conferencing, hospitality and other uses of space within the venue require suitable investment in infrastructure to meet the needs and expectation of the audience.

In modern venues, distributed video content is a must have.

With previous technology, a retrofit required significant infrastructure amendment. Today with the AMX SVSI technology, high-definition audio and video content can be effectively converged across the existing IT infrastructure.

These systems can optimise the venue through additional advertising revenue, simplify security and safety purposes and also drive traffic to concessions.

At HARMAN, more of our products than ever form part of the IP connected world. This streamlines the infrastructure requirements and enables future scalability to meet new demands; for example, the trend toward line-array audio solutions within the main bowl comes with certain challenges, traditionally weight loading and the potential to need additional amplification.

With the new technology available today our VLA-Compact product is lightweight and compact which takes away some of these challenges.

Furthermore, increases in the efficiency of amplifier technology and simplified IP connectivity reduce the difficulties associated with these changes.

Our Sales Director of 'Enterprise Sales' Sam Brandon is focused on making sure that engagement is implemented early on projects such as this, not just with the AV team but also with the IT contractor.

These days there is a growing recognition of the importance of high quality audio to help maximise the experience of fans at a live sporting event or concert. How important a consideration is this 'fan experience' to HARMAN and your approach to this market?

HARMAN and JBL have always been at the forefront of audio quality in the home, connected car and professional environment.

In a stadium, the audio system or PA/VA is first and foremost an extension of the security/fire system and rightly so.

The priorities within the security system are different from a solution solely designed for fan enjoyment. The wow factor experienced at a large live music concert or in a cinema requires a full range, high output sound system.

All JBL Professional, Crown and BSS Audio products utilised in stadia & arena projects are high performance solutions and we pride ourselves on always delivering a system that encompasses the required security and safety elements alongside best in class fan experience. Our work supporting the world's biggest artists on stage, translates to our ability to deliver brilliant solutions for engaging sports presentation.

Are you currently working on any notable upcoming sports venue projects?

Unfortunately, at this time we cannot say, but there will be some notable sports venue projects that we will be able to give the inside scoop to PanStadia & Arena Management magazine about in upcoming issues.

Are HARMAN currently developing any new product/solution innovations which will be of direct benefit to sports venue owners, operators or integrators?

Yes, we have recently launched the JBL VLA-Compact which takes the very best from the JBL Professional VTX touring solutions for premium music grade quality audio performance, combined with the wealth of knowledge in waveguide technology and enclosure design to result in a weatherised, small format, line array solution with a variable horizontal coverage designed for stadia applications.

This product, combined with our high performance, multi-channel, networked, energy efficient Crown amplifiers and scalable BSS Audio DSP and networked audio platform, creates a best in class total audio solution designed for the challenging task of sound reinforcement within stadia projects. ■



JBL VLA-Compact solutions have a wide application for modern stadia

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YOUR AREAS OF INTEREST

Please send me the latest information on these aspects of sports venue design, finance, management, operations and technology:

- | | | | |
|------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------|
| <input type="checkbox"/> Access control | <input type="checkbox"/> Customer relationship management (CRM) | <input type="checkbox"/> Membrane systems | <input type="checkbox"/> Suite management |
| <input type="checkbox"/> Acoustics/audio systems | <input type="checkbox"/> Electronic displays | <input type="checkbox"/> Merchandising/novelties | <input type="checkbox"/> Systems integration |
| <input type="checkbox"/> Adhesives | <input type="checkbox"/> Engineering: electrical/mechanical | <input type="checkbox"/> Naming rights | <input type="checkbox"/> Temporary flooring |
| <input type="checkbox"/> Architecture and design | <input type="checkbox"/> Event management/planning | <input type="checkbox"/> Point-of-sale products | <input type="checkbox"/> Ticketing systems/services |
| <input type="checkbox"/> Athletics/sports equipment | <input type="checkbox"/> Facilities management | <input type="checkbox"/> Practice/training facilities and systems | <input type="checkbox"/> Timing/scoring systems |
| <input type="checkbox"/> AV systems | <input type="checkbox"/> Fan attractions | <input type="checkbox"/> Project management | <input type="checkbox"/> Transport planning and operations |
| <input type="checkbox"/> Broadcast/TV technologies | <input type="checkbox"/> Feasibility studies | <input type="checkbox"/> Retailing: concepts/systems | <input type="checkbox"/> Turf management/maintenance |
| <input type="checkbox"/> Catering/concessions | <input type="checkbox"/> Financial management/services | <input type="checkbox"/> Retrofit and refurbishment | <input type="checkbox"/> Turf natural |
| <input type="checkbox"/> CCTV | <input type="checkbox"/> HVAC/insulation/energy management | <input type="checkbox"/> Rigging systems/fall safety | <input type="checkbox"/> Turf synthetic |
| <input type="checkbox"/> Cleaning products/services | <input type="checkbox"/> Ice-rink systems/products | <input type="checkbox"/> Roof systems | <input type="checkbox"/> Waste management/recycling |
| <input type="checkbox"/> Computer systems/networks | <input type="checkbox"/> Interior design/theming | <input type="checkbox"/> Scoreboards | <input type="checkbox"/> Wi-fi/4G coverage |
| <input type="checkbox"/> Concert/production services | <input type="checkbox"/> Internet services | <input type="checkbox"/> Seating: fixed/temporary/retractable | Others (please list) |
| <input type="checkbox"/> Concession carts | <input type="checkbox"/> Lighting: sports/emergency | <input type="checkbox"/> Security | |
| <input type="checkbox"/> Construction | <input type="checkbox"/> Loyalty programmes | <input type="checkbox"/> Signage/advertising | |
| <input type="checkbox"/> Consultants | <input type="checkbox"/> Luxury suite design/services | <input type="checkbox"/> Signage/wayfinding | |
| <input type="checkbox"/> Coverings: pitch/floor | <input type="checkbox"/> Marketing/advertising | <input type="checkbox"/> Smart cards | |
| <input type="checkbox"/> Crowd management/barriers | | <input type="checkbox"/> Sports floorings | |
| | | <input type="checkbox"/> Structural engineering | |

YOUR DETAILS

(please complete ALL sections)

Full name	<input type="text"/>		
Organisation/company	<input type="text"/>		
Job title	<input type="text"/>		
Address	<input type="text"/>		
	<input type="text"/>		
Post/zip code	<input type="text"/>	Country	<input type="text"/>
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A QUESTION OF TASTE

Food and beverage is becoming an increasingly important player when it comes to attracting fans to sports venues.

While team owners have little influence over what happens out on the pitch, they can control the atmosphere in a stadium or arena and food and beverage is probably the most important aspect of that.

Fans are demanding more choice and better service and venues are pulling out all the stops to keep them coming back for more.

Chris Bigelow of the US-based **Bigelow Group of Companies** believes stadiums and arenas are doing more than ever to boost revenues through F&B operations.

He said: *"It certainly seems like the food and beverage operation has become more important to the overall fan experience at venues. It's all about getting the fans in early so that they spend more money."*

"I would say the big trend that we're hearing from everybody now is they want local foods. They want something unique in their venue that represents the community there. Certain cities like Kansas City or Memphis are known for their barbecue. So that's what they want."

"In other places like Milwaukee with a big German population, they're known for bratwurst. In San Francisco, garlic fries have become their signature. Each city has its own visions and the stadia there try to reflect that."

Centerplate recently extended a deal to operate at **Hard Rock Stadium** in Miami, where its emphasis on innovative, local cuisine is a big draw, continuing a



People take refreshments at a bar in the Fan Zone of the UEFA Champions League on May 24, 2018 in Kiev

Image credit: Mikheyev Viktor / Shutterstock



commitment to bring fresh flavour and a diverse array of options to the venue.

The menus include fresh and renowned food and beverage offerings sourced directly from South Florida. The stadium, home of the **Miami Dolphins**, also has 50 craft beers on offer.

Bigelow said another key movement is the celebrity chef programme which is continuing to grow and help drive venue revenue growth.

"It's not necessarily about nationally known chefs but somebody that has a local restaurant in that town. They come in on a rotating basis and offer their product and the fans really like that, especially when it changes from match to match with different chefs highlighted."

"I hate to say the food's more important than the game itself but in the States I think that may be the case."

OPEN SPACES

Another emerging trend is for new venues to have much wider and larger concourses with areas to sit down and eat.

Bigelow added: *"Times are changing from when you had to stand up and rest on a trash can."*

"The whole idea of gathering spaces and party decks is growing and becoming a big play in new stadium construction."

"Nobody wants to sit in their seats anymore. They want to get up to walk around and they want to know what's going on at the event that they've bought a ticket for. But they like to have a pub like atmosphere that they can enjoy with TVs all over to keep up with the action on the field."

This move towards venue mobility has been driven principally by the Millennial generation.

"Because there are so many options up on the concourse people really do want to get up out of their seats and go see what else is out there," Bigelow added.

Bigelow also said the VIP suite business is changing dramatically.

"People don't want the big 20 person suite and so a lot of buildings are converting those into the theatre box concept or the party suite where it's all inclusive."

"That's a big trend right now in food and beverage. Everything's paid for and fans don't have to buy anything."

As technology advances, robot service could also be making headlines in stadia and arenas in the next few years.

Bigelow added: *"Everybody's trying to look at robotics because most of the markets that we deal in all have some labour issues."*

"Food service historically has not been a very high paid career and it's tough getting employees, so there's a couple of companies that are experimenting with robots that make hamburgers. The other day I saw a robot making pizza. But I think there's still a long way to go. It's obviously capital intensive so it's an offset of the money you put up front to save on labour."

MOVING FORWARD

In Europe too, tastes are changing and venue operators are looking to stay one step ahead of the game.

Roy Westwood, Strategy, Creativity & Innovations Director at consultants **Forward Associates** told *PS&AM* that how we eat out is always changing and that new ideas and concepts are constantly emerging to keep the wheel turning.

But it isn't always the new that makes the most impression. Sometimes it's the tried and tested. The new thrill of the old.

Westwood said: *"The need for interactive entertainment is a trend with serious traction. Think about how our grandparents used to socialise – at tea dances and jazz clubs. They offered something visceral in addition to the food and drink. Another reason to visit."*

How we have come full circle can be shown by the success of **Bounce**, **Flight Club**, **Puttshack** and London pop-up sensation, **Pergola**.

Ping-pong venue **Bounce** launched in London in 2012. It has since opened a new outlet in Chicago and is widely regarded by the industry as a game-changer in social entertainment venues.

Bounce, **Flight Club** and newcomer **Puttshack** are built around quality food and drink but with an added interactive element, in these cases, table tennis, darts and golf. >>



« They are all under the same stable, founded by entrepreneur Adam Breeden, who also created All Star Lanes bowling.

Puttshack is the latest – a crazy golf concept using advanced technology and accompanied by an extensive food and drink offering.

Westwood added: *“The impressive growth in the Bounce family, to include darts and now golf, shows the irresistible demand for something different. It is a trend that fits perfectly with stadiums and opens up a significant new market for those that might not opt for traditional hospitality.”*

Pergola on the Roof has transformed the top of the BBC Television Centre into a must-see destination. Pergola effortlessly switches from a Mediterranean incarnation to a Nordic forest for the winter and as such operates at full 600-capacity all year round.

“The success of Bounce and Pergola has shown the appetite people have for experiences. This need for social entertainment, or the hybrid

model as it is sometimes known, taps into the idea of multiple attractions in one place. Food and drink is just one part of the jigsaw.

“At Forward Associates, we have been quick to see the potential of this trend. We have been appointed in Europe and Asia to create a number of different hybrid concepts that merge everything, from bowling to extreme sports, with live music, dining and retail.

“At another major European stadium development, hospitality guests are to have a choice of activities on a match-by-match basis. Transforming an unremarkable space without pitch view, we have created a revolving hospitality space, that offers a new experience every week.

“This is the UK’s first bunker box experience. It combines the best seats in the house with six distinct and always-evolving concepts. This offers the guest the best of both worlds, combining their own personal space with something new every matchday.”

Concepts include The Music Room, complete with DJ, live music, karaoke, vintage Wurlitzers and a vinyl library. Or The Games Room with table

football, vintage arcade consoles and table tennis.

ESPORTS ON THE MENU

It is not only traditional sports and pastimes that can be adapted for the hospitality industry.

“In Asia, one of the concepts developed was to tap into the burgeoning eSports scene. eSports is big business and attracts a younger audience who may not normally consider matchday hospitality. In addition, this is a concept with a serious non-matchday presence which attracts new and growing audiences to the stadium 365-days-a-year,” Westwood added.

“Demand for experiences is growing. A great meal or drink will always have currency, but we are increasingly seeing this is not enough. The value of putting on a show has never been more important.

“People are prepared to pay a significant premium for the immersive and it this mindset we need to capture in stadia and arenas.

“We need to be more creative. Take the retail landscape. When people dine out they invariably eat on the high street, so why should the experience offered at

Queuing for drinks at the O2 Arena in London
Image credit: Levy restaurants





Garlic Fries AT&T Stadium San Francisco

sporting events be any less than that of the high street? Stadiums have to up their game."

The same applies for the general admission guest. It's no longer enough to dispense food quickly from a hole in the wall. People have higher expectations than ever before. They want multiple experiences – from the tried and tested to the new to the market.

Stadia should be living breathing entities – a round-the-clock community asset where the event is just one of a number different, inspiring experiences.

Westwood said: "The duality of these spaces makes these attractive propositions for stadium operators. On matchdays its natural gravitational pull will draw fans in, but crucially it has the pulling power to attract an entirely different audience the rest of the week too.

"We shouldn't just parachute in once a fortnight. The stadium should be alive from early morning to late at night, 365-days a year."

"In addition to the need for hybrid venues, food and drink does not take a back seat. Production is not hidden away in a basement.

The preparation and cooking of dishes should be part of the spectacle.

"The same idea of breaking borders between front and back of house applies to the line between the inside and the outside of the stadium. We look to open up buildings, add terraces and break the physical extremes of buildings, to create vibrant community hubs.

"Today's guest isn't happy being a passive bystander and is instead looking for something personal and experiential.

"Yes, a great ticket for the main event will always be attractive but if the



Serving up the famous Dodger Dog

overall experience fails to make the grade, it is only the loyal that return.

"This is where Forward Associates can help stadium operators steal a march on the competition. Our proven track record at the world's greatest stadia is built around the guest and taps into this desire to connect with people. These are not add-ons, but targeted social experiences that are designed to build the emotional affinity with any given event. In summary, we go beyond the game to deliver something that lives up to the best of the action on the pitch." ■



STAND OUT FROM THE CROWD WITH IRP

Foodservice carts that stand out from the crowd have the added bonus of scoring free social media advertising for venues.

When acquiring custom-designed foodservice equipment it is crucial for the client to think outside the box, literally.

A simple graphic facade on a rectangular base can serve its purpose, but greater consideration must be given when the project calls for outfitting an entire stadium or arena.

A traditional cart design can benefit from dimensional application of materials; a great way to achieve this is through the use of faux façade panels like brick, stone, subway tile, and wood, all of which provide texture and depth without impeding the mobility of the cart due to weight.

Digital monitors and menu boards on headers have become commonplace, and allow the venue the option of changing menu offerings and pricing quickly and conveniently.

A design feature becoming increasingly common is the use of interconnecting carts to create a uniquely-shaped kiosk, and the use of a coordinating front and back cart.

Modular design allows for more flexibility when accommodating placement considerations, and creates the illusion of permanence without the required commitment.

BLUE MOON

One Iowa Rotocast Plastics (IRP) project worth noting that exemplified these concepts was the U-shaped Blue Moon branded 'Tap Room' bar, fabricated for client HMS Host for placement in the Memphis International Airport.

The bar is comprised of four connecting sections, including a wood backwall showcasing a large RenShape moon with adhesive graphic, 32 inch monitor, and illuminated liquor display.

The bar façade base is covered with a white Sioux City thin brick and Caesarstone was used for the countertop material.

Equipment within the bar included an undercounter refrigerator, UL listed pull out sink, self-contained direct draw four keg Perlick, cash register station, locking cabinets, and polished brass foot rails. The bar area can accommodate nine stools comfortably.

Spectators are all about the overall experience, particularly your millennial event-goer.

A novelty cart can captivate the customer, increase engagement, and enhance their event experience. Notable projects in the IRP portfolio include walking taco carts, dessert carts, BBQ and carvery carts.



Doritos walking taco cart: US Bank Stadium

Novelty foods aside, even traditional food and drink offerings can create a buzz when the spectator is purchasing from a novelty cart design; IRP examples include a Busch branded race car, Shock Top retro van, and a draught cart designed to resemble an ice resurfacing machine.

Projects like this provide photo-op worthy moments for spectators of all ages, and have the added bonus of scoring your venue free social media advertising in the process.

Additionally, a cart designed specifically for regional food and drink favourites is a great way to laud your city's cultural cuisine preferences and is guaranteed to enhance your spectator's overall event experience. ■



CREATE A LASTING IMPRESSION

INNOVATIVE & CUSTOM FABRICATION



THINK OUTSIDE THE BOX

IRP, founded in 1986, is your trusted supplier of fabricated carts and kiosks for mobile food service. Cart facades can match any existing design and architecture. IRP also offers a wide range of products including ice-down merchandising solutions, wire racks, and electric refrigeration.

Check out more great products at IRPINC.COM or follow us online at [f](https://www.facebook.com/IRPINC) [i](https://www.instagram.com/IRPINC) [l](https://www.linkedin.com/company/IRPINC) [t](https://www.tiktok.com/@IRPINC) **IRPINC** • 800.553.0050 • 563.382.9636

SEEING IS BELIEVING

Video screens can bring fans to the heart of the action, wherever they are in a stadium.

Video screens within stadia and arenas are becoming bigger and better as technology evolves.

Not only are they being used to beam replays of the action on the field to the crowd in their seats, increasingly they are migrating onto concourses to entertain fans and make sure they don't miss any of the action.

New venues like the **Mercedes-Benz Stadium**, home of the **NFL's Atlanta Falcon** and the **MLS's Atlanta United** have the capacity to incorporate truly mind-blowing 360 degree halo displays.

And older venues are upgrading their visual display assets to make sure they offer great experiences so fans keep coming back.

Jay Parker, Vice President of Large Sports Venues at **Daktronics**, told *P5&AM* that his company recently completed an upgrade for the **MLB's Colorado Rockies** at **Coors Field**.

He said: *"We just installed pretty much a whole new system including videoboard and LED fascia. All the existing displays were about 10 or 12 years old."*

"The Rockies is a unique installation because it's in Denver Colorado with the Rockies mountain range as a backdrop and the board has a jagged edge to resemble a mountain-scape at the top of that display. It's really unique. It's not just a rectangle and it really gives you a great perspective."

Rockies Executive Vice President/COO Greg Feasel

Braves

Inciarte
Tucker Markakis
Swanson Albies
Flaherty McCarthy Freeman
Suzuki

DUE UP

22 Markakis RF .308
24 Suzuki C .400
20 Tucker LF .455

McCarthy 32 RHP

19 BALLS 58 STRIKES
IP 9.0 ER 5
H 10 BB 4
R 5 SO 6

25°

1 2 3 4 5 6 7 8 9 R H E
4 0 0 0 0 0 0 0 0 4 5 0
1 0 0 2 0 0 0 0 0 3 4 0

1-1
2 OUTS

CHRIS IANNETTA 22 C
GAME SUMMARY: 1-1, 2B
2nd DOUBLED TO LEFT

ROCKIES

19 Blackmon CF .333
9 LeMahieu 2B .296
28 Arenado 3B .222
5 Gonzalez RF .286
20 Desmond 1B .320
8 Parra LF .174
27 Story SS .179
22 Iannetta C .421

H	AB	2B	3B
8	19	1	0
HR	RBI	OBP	SLG
0	2	.500	.474

48 Marquez P .333

Coca-Cola

Coors LIGHT

The new Colorado Rockies videoboard



said: *"We are always looking for ways to ensure the fan experience at Coors Field continues to be one of the best in all of sports."*

"Among the other facility improvements, we feel the new scoreboard is a critical enhancement for our 25th Anniversary Season. Daktronics has been a great partner in the design and advanced technology, and we were excited to present it to Rockies fans on Opening Day, 2018."

The new main outfield video display measures approximately 59ft (18m) high by 116.5ft (35.5m) wide featuring a 13HD pixel layout for exceptional image clarity and contrast.

Taking the rock formation into account, the display will feature more than 6.8 million LEDs. It would take 734 60-inch televisions to cover the entire display.

Capable of variable content zoning, the new video display can show one large image or multiple different zones of content including live video, instant replays, up-to-the-minute statistics, graphics and sponsorship messages.

Daktronics has also recently installed a new display system for the **Los Angeles Angels** of Anaheim, California, and is working on **Tottenham Hotspur's** new stadium in London.

Four main video displays totalling more than 1,000m² (10,764ft²), two façade displays and three tiers of ribbon displays have been installed in 2018 at Tottenham.

The two south end displays will each encompass 325m² (3,498ft²) and the two north end displays will each encompass 190.7m² (2,052ft²).

Two additional displays in the south west and south east will measure 178.9m² (1,926ft²). Each main display will feature 13HD pixel layouts to bring excellent image clarity and contrast to fans in every seat.

Each main video display will feature variable content zoning allowing each to show one large image or to be divided into multiple windows to show any combination of live video, instant replays, statistics and match data, graphics and animations, and sponsorship messages.

The three tiers of LED ribbon displays will deliver fan engagement through the event-day experience.

It is the first time three sets of ribbon displays have been featured inside a stadium in the United Kingdom.

The upper and middle tier ribbons will run from the east to west stands through the north stand. The upper measures 387m (1,269ft) long while the lower measures 348m (1,142ft) long. The suite tier ribbon will be split into two runs along the east and west stands measuring 122m (400ft) long on the east and 105m (344ft) long on the west.

TECHNOLOGY ADVANCES

Parker explained how videoboard technology is moving forward.

He said: *"A lot of stadiums we have worked on have used through-hole technology because that technology has been able to get bright enough and it has matured in the industry."*

"It gets bright enough to compete with the direct sunlight when it's hitting it right in the face. In these open air

stadiums you have a lot of sunlight and we've all gone to games where the sun just knocks out the video board image until it gets dark enough."

"The through hole product has allowed us to get bright enough that we can compete with the sun and those heavy sun moments during a game."

He said that surface mount technology, which is a 3 in 1 package which traditionally has been used indoors, is now starting to be used more and more outdoors.

"This surface-mount technology can allow you to get higher resolution displays. So we're not only going bigger in displays but looking at going higher resolution. We're talking high definition and 4K. I don't know if we'll ever get to 8K but that's still a possibility."

He said venues are looking at buying higher resolution equipment in order to future proof for the next 10 years.

"High resolution surface mount technology allows us to do that and surface mount technology is improving on two fronts. One is it is able to get brighter than it was before so we're able to compete with the sunlight better; it does use more power which is a drawback but its weatherproofing is improving. Weatherproofing on LED displays is still a big challenge in the outdoor environment – you need to make sure it is protected from the elements, not only moisture, heat, rain but also UV degradation. Sunlight beating on a display 365 days a year is hard on the LEDs." »

« CONCOURSE ENTERTAINMENT

Parker also said another trend in stadiums was the move to more concourse entertainment video displays.

He said: *"We have done a great job of putting displays in the seating bowl, so we have got big video displays and a lot of LED fascia products. In soccer we have pitch displays on the field level."*

"What we're seeing today is them moving towards concourses and we've developed a number of really high resolution products for concourses that can replace video walls or even some LCD TV sets in the concourses. Anywhere from 2.5mm to 1.9mm to 1.2mm."

"We're seeing more and more of the movement to the concourses to try and create more of an entertainment space in the concourses. This is to get the fans to come into the stadium earlier and stay later and entertain them better while they're in there."

The screens show fans the game they're at while enjoying food and beverage in the club area or the concourse just to make sure they don't miss any game action.

"It could also show games from around the league to see how other

teams are doing, as well as stats. And of course there's always an element of advertising."

CIRCUIT DE BARCELONA-CATALUNYA

The problem of sunlight and protecting LED screens from the elements is also a concern for motor racing circuits.

Juan Carlos Acerete is project manager at **Crambo**, which has recently installed **Absen** screens at the **Circuit de Barcelona-Catalunya** ahead of the **MotoGP** and **Formula 1 Grand Prix** seasons.

He said: *"With the sun shining directly on the screens during the races, LED is the only suitable option to display images and videos. At 5.2mm, the Absen X5 offers the perfect pixel pitch for most events and allows us to play with resolutions that are close to Full HD, as most displays in the Circuit measure 10m x 5.62m."*

Prior to the installation, a system of fibre optic cables was installed into the surface of the circuit.

This readied the arena to transmit video at the highest possible quality – to over 20 television displays as well as screens of different formats, spread around the circuit and indoor areas.

Crambo supplied and installed a staggering 700m² (7,535ft²) of Absen X5 LED panels.

The Absen M2.9 LED displays are situated in areas where the public is in close proximity to the display.

Acerete explained: *"The resolution of the Absen M2.9 is perfect for close viewing. The result is absolutely amazing with crystal clear images."*

Outside the racetrack, the Circuit's conference and indoor spaces feature a combination of Absen A3 and M2.9 LED panels to provide image and video relay.

Acerete describes the Absen A3 panels as 'all-terrain' and they feature heavily across the complex.

Joan Thomas, Crambo's Catalunya & international director, added: *"The customer is very satisfied. The combination of Crambo's expertise alongside Absen displays has resulted in a huge qualitative leap, not only in terms of resolution but also angles of vision, brightness and colour quality. For prestigious events such as the Formula One Grand Prix, and with such a large amount of screens required, it is critical to use the best technical equipment, and Absen X5 is instrumental to a perfect result."* ■

Video screens at the Circuit de Barcelona-Catalunya





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GAME PRESENTATION

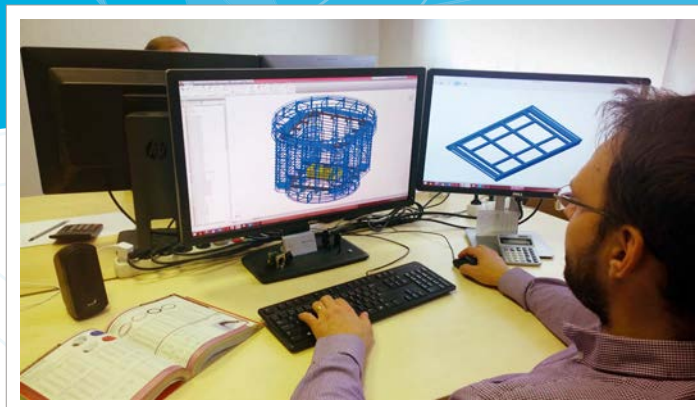


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GAME PRESENTATION

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LED DISPLAY SOLUTIONS

TURKEY'S LARGEST FINE PITCH LED WALL

Colosseo installed its proven technology in Istanbul's main traffic control centre to keep fans safely on the move to and from stadia and arenas in the city.

With a growing population of over 18 million, transportation has always been a huge challenge for Istanbul in Turkey, and its daily monitoring and management is essential.

City officials were becoming increasingly aware that their goal of winning bids for prominent major sporting events was being hindered by a global perception of grid-locked roads, which would impact on the experience for overseas fans.

This and other factors resulted in an urgent requirement for an advanced traffic control centre equipped with the latest technologies, able to process a huge number of live camera feeds covering the whole city.

The main initiator of the whole project was **Istanbul IT** and **Smart City Technologies Inc. (ISBAK)**, a local company with over 30 years of proven experience of the market in Intelligent Transportation Systems, and Smart Cities architecture, both in Turkey and internationally.

Colosseo, along with its local partner **Ultima**, was chosen for this project as it's globally recognised as being a turnkey provider of both hardware and software solutions, with a proven long term track-record in live video

processing and multimedia management in one package.

Istanbul Hisarüstü Traffic Control Centre now features Turkey's largest indoor curved fine pitch LED video wall with a total LED area of 55m², featuring only 1.2mm line spacing, designed, manufactured and installed by Colosseo.

It also features a highly advanced solution for management of all live camera feeds and multimedia content, the Video Wall Manager, a new member of the Colosseo Enterprise product portfolio. This has helped to transform it into the most modern control centre in the region.

Ms. Esma DİLEK, Managing Director of the Transport Management Centre, said: *"It has been a radical decision for Istanbul Metropolitan Municipality (IMM) to shift to an LED video wall system for its Transport Management Centre which coordinates all transport modes in Istanbul. From the very beginning, ColosseoEAS's technical team guided us on how to integrate our cameras onto the new platform and helped us set up the new video wall platform seamlessly."*

Based on the Colosseo Single Media Platform's proven and reliable

infrastructure, the system has taken over two thousand live camera feeds throughout the Istanbul area, covering all key road networks and provides full freedom to organise them into various presets, sizes and positions on the giant fine pitch video wall.

The Colosseo system also includes advanced geographic filter for all available camera sources allowing selection of any location on the interactive map, plus integrating external media sources like **Google** maps or web pages, RSS and XML feeds. These can be rendered on the video wall in a predefined graphic template.

Esma added: *"From an end-user point of view, it's quite practical and easy to manage with the layouts of the video wall system which minimises the time to get used to a new management platform. The user interface is user-friendly, intuitive, and the functionalities of the management software make it easy to manage and configure based on our needs."*

Due to the growing demand for Colosseo technologies in Turkey, Colosseo recently opened its new office in Istanbul, shared with Ultima, that provides consultancy, sales, installation and support.



Muhammed ALYÜRÜK,
CEO/General
Manager
of ISBAK
told PS&AM
about some of the
company's work.



What is the role of ISBAK in the smart city strategy of Istanbul?

First of all, I need to underline that ISBAK is an affiliate company of Istanbul Metropolitan Municipality and responsible for the planning, development, implementation and maintenance of technological investments in Istanbul (and also in other cities). In 2016, we took on a new responsibility: "Smart City Consultancy". Being main consultant of the smart city project is a very serious and important task for us. We had to put together global experience with the local ecosystem. And I can proudly say that we did so successfully.

What are the key innovative projects ISBAK has delivered for Istanbul city in the last two years?

One of these projects is the renovation of Sinan Erdem Sport Arena. Just before basketball's Euroleague Final Four matches we renovated all the electronic systems, including the cube screen which is the second largest in the world. We also established a new Transportation Management Centre (UYM) in 2018. It is from here that Istanbul Metropolitan Municipality monitors all types of transportation across the city and is able to respond to emergencies.

Istanbul has a population of over 18 million and is facing lot of challenges. One of the biggest seems to be transportation?

Yes, that is right. Not only for Istanbul, but also for all mega cities. We are aware of this challenge and for the last 20 years the biggest share of the annual budget goes towards transportation. Besides investment in the metro system, we also invest in intelligent transportation systems, like adaptive signal control systems, a taxi management system and mobility as a service. From our new Transportation



FEATURE
THE BIG
PICTURE

Management Centre we can provide multimodal transportation operations for safe and fast transportation alternatives for our citizens.

What were the expectations from the new traffic command & control centre/KPI?

Our main target was to control transportation facilities from a single hub and reduce travel times and congestion in the city. To achieve this, we established this modern and sophisticated centre to manage the city's transportation network. For camera displays and integrated platforms, we used fine pitch LED as a video wall, which will work 24/7 and 99.9% of the time error free.

What is the practical experience after a few months of operation?

Integration of over 2,000 traffic IP cameras and display flexibility were new challenges for us. The video quality and adaptive features of the large scale, fine pitch LED screen has been most impressive. Our software engineers have great flexibility over the new platform which takes the transportation management centre to a new level. I owe a debt of thanks to ColosseoEAS for their partnership.

How does ISBAK sees the future of the command and control centre?

Knowing the advantages of the integrated platform for camera and content management for video walls on a seamless canvas with fine pitch LED, ISBAK is able to evaluate possible solutions for the future of smart cities. We have powerful tools in our control centre which can be used to manage not just transportation but whole city infrastructure in the near future. The first really big test could be EURO 2024, which Istanbul has applied to host.

What will be the main role of the Hisarüstü Traffic Control Centre if the EURO 2024 bid is successful?

It will have a crucial role in giving us critical real-time information of any potential traffic problems in the main transport routes to the stadiums and fan zones that will be used in the build-up to the matches and after they finish. The enhanced technology solutions that we are now using from ColosseoEAS will help us significantly reduce these problems and maximise the positive experience for visiting fans. ■

The **Turkish Football Federation (TFF)** recently submitted its bid to host the **EURO 2024 Championship Finals**, competing against a bid from the **German Football Association (DFB)**. The bid includes two proposed iconic Istanbul stadiums, **Atatürk Olympic Stadium** and the **Ali Sami Yen Sports Complex - Türk Telekom Stadium**.

Being able to demonstrate a responsive real-time transportation management strategy for moving fans around such a congested city is seen by many experts as being a key factor in a successful bid.

The use of Colosseo's technology at the Hisarüstü Traffic Control Centre certainly helps to demonstrate Istanbul's commitment to meeting this critical objective. **UEFA** will announce the host nation on 27 September.



ANGELS SHINE BRIGHT

The Los Angeles Angels debuted their new Daktronics LED displays at the start of the 2018 MLB season.

The Los Angeles Angels of Anaheim, California, USA, were looking to improve the experience at their ballpark for fans while creating an edge for the home team. They started by working with **Daktronics** to design and manufacture 15 LED displays totalling more than 23,000 ft², all of which were installed prior to the 2018 baseball season.

"While putting a perennial contender on the field remains a top priority, the fan experience is very important to Angels Baseball," said Angels Club President Jon Carpino. "We believe this investment into Angel Stadium will dramatically enhance the overall experience for our loyal and dedicated fan base."

The focus of the installation and display improvements is venue wide. Fans and event goers will be engaged from the streets to their seats with new LED products. A new "Big A

Marquee" display outside of the stadium welcomes fans to the venue.

Entering the stadium new auxiliary displays connect with fans as they make their way to their seats. Once they sit down they are surrounded with digital content from eight new ribbon displays installed along the seating fascia of the stadium. An outfield fence display keeps them informed of out-of-town scores while enjoying the live action of the Angels on the field.

Then fans will notice the outfield main video displays. The new display in right field is the largest at 9,500 ft² – the third largest in **Major League Baseball**. The display in left field is 5,488 ft². Both feature 13HD pixel layouts and 11,000 nits of brightness to combat the ever-present California sun.

The combined effect of the displays keeps fans immersed in the action as it plays out on the field before their eyes. It also energises them as the game goes

on with the statistics and replays they crave. Daktronics Show Control System, an industry-leading control solution, is included with this installation to help with content coordination and playback. It provides a combination of control software, data integration, video processing and playback hardware in an easy-to-use production solution.

The team benefits from return on investment sponsorship dollars. Sponsors benefit by placing their messages in front of a massive captive audience as they enjoy themselves at a ballgame. Fans benefit by receiving a one-of-a-kind experience that can only be had while in person at the event.

The Angels unveiled their system this spring, prior to the start of the 2018 season. The solution is currently enhancing the fan experience with eye-catching graphics and content on larger-than-life displays. ■





EVERY MOMENT MATTERS

" WHILE PUTTING A PERENNIAL
CONTENDER ON THE FIELD REMAINS A
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WE BELIEVE THIS INVESTMENT INTO
ANGEL STADIUM WILL DRAMATICALLY
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OUR LOYAL AND DEDICATED FAN BASE."

Jon Carpino
Angels Club President

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DAKTRONICS
1968 – 2018

AFTER THE LIGHT

Musco Lighting explains why the warranty backing your sports lighting system is as important as the technology itself.

The installation, final testing, and initial operation of your new sports lighting system might feel like the end of your lighting project. Truth is, it's only the beginning.

That's because those lights will need to be serviced and maintained over the course of many years. And while, on the surface, manufacturer warranties might all appear to be the same, in most cases they're not.

So understanding precisely what your warranty covers and the processes involved with the maintenance of your system is critical to ensure you're getting the most reliable and cost-effective solution.

"When it comes to your warranty, the devil most certainly is in the details," said Jeff Rogers, Vice President of **Musco Sports Lighting**.

"Unfortunately, it does happen where an issue comes up and the owners find out there are a bunch of complicated hoops they need to jump through to get the problem fixed. And most of the time it's too late to do much about it."

Rogers stresses the importance of being proactive early and asking the tough questions of any manufacturer being considered.

WHAT'S REALLY COVERED?

It may seem obvious, but it's essential to do the research with any warranty you're considering to ensure there are no manufacturer loopholes with regards to what's covered. This is especially important since most providers simply manufacture light fixtures—as opposed to complete systems—resulting in lighting that's comprised of parts and pieces that haven't been designed to work together.

Musco backs its LED systems—in which the lighting, electrical, and structural components have been engineered to work together—with a long-term warranty covering every part and all the labor involved with maintaining and servicing your lights.

WHO'S COVERING WHAT?

Most sports lighting manufacturers don't build many of the parts that ultimately comprise the lighting they install, and instead use parts that are supplied from sub-vendors. So while it may appear as though a part is covered, you may find yourself dealing with a different company altogether and be subject to their warranty stipulations, which you've never even seen.

For Musco's customers, any time a replacement part is needed they know it will come directly from Musco, with service provided by the company's global network of technicians.

WHAT WILL BE EXPECTED OF YOU?

Strange as it may sound, there are warranties that require the customer to put in nearly as much work as the company they've hired. This may include things like having to disassemble various parts and ship them back to the manufacturer yourself, before they determine if the problem is covered.

Included in Musco's warranty is on-site service for routine maintenance, repairs, and analysis of all of its sports lighting solutions, from regionally-based technicians.

"The warranty is one of the most important considerations in any sports lighting project," Rogers said. *"We cover every part and all the labour, and we guarantee light levels through the duration of the warranty. So there are no surprises, from the moment those lights first turn on well into the future."* ■



Hazza bin Zayed Stadium installed Musco's Total Light Control—TLC for LED@ system in preparation for the 2018 FIFA Club World Cup and the 2019 AFC Asian Cup, becoming the first football venue in the United Arab Emirates to feature LED lighting.

TLC[®] for LED[®]

Total Light Control

With a distinctive system approach to sports lighting, our LED technology delivers the light quality, uniformity, glare control, energy efficiency, DMX special effects capabilities, and long-term parts and labor warranty that's made it the solution of choice at thousands of stadiums, arenas, and venues around the world.



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GOLD COAST LEGACY

Legacy building has been an important aspect of the Gold Coast Commonwealth Games.

Following on from the phenomenal success of the **Gold Coast 2018 Commonwealth Games** in Australia, the city is working hard to build on the legacy of the Games.

Politicians and stakeholders are looking to attract a range of events to the region and Commonwealth Games and Tourism Industry Development Minister Kate Jones said it was her priority to build on the success of the Commonwealth Games and create a long-term legacy for Queensland.

She said: *"The Games are proof that Queensland is among the best major sporting destinations on the globe."*

"We have some of the best sporting venues in the world which we want to continue to benefit the state's economy for years to come."

"From beach volleyball on the sands of Coolangatta beach to the world-class Gold Coast Sports and Leisure Centre at Carrara, the Games have helped to strengthen our reputation as a world-class event leader."

Ms Jones said events that appealed to key markets - including high value endurance events, world cups, championships and multisport

events - would be targeted for staging in Queensland over the next three to five years.

"Our bold target is for Queensland's events calendar to be worth A\$1.5 billion to the Queensland economy by 2025," she said.

"While the Commonwealth Games has already brought significant benefit to the state's economy, and will continue to do so, the Palaszczuk Government is focused on how we can leverage the Games to make sure those benefits continue in the future and leave a lasting legacy for Queensland."

The Gold Coast 2018 Commonwealth Games (GC2018) events were hosted across 18 world-class competition venues located on the Gold Coast, Brisbane, Cairns and Townsville.

Three new competition venues were built and seven more were upgraded to provide long-lasting sport and community facilities for South East Queensland.

The A\$320 million GC2018 sporting infrastructure programme was funded by the Queensland and Australian Governments.



Image credit: Shutterstock

The **Commonwealth Games Village** was one of the most significant legacy projects of GC2018. The 1,252 new apartments and 82 townhouses across 18 buildings provided accommodation and services to 6,600 athletes and officials during GC2018.

They will now be used for residential units.

All competition venues and the Games Village were completed well ahead of the Games, allowing time to be thoroughly tested prior to hosting the GC2018.



GOLD COAST SPORTS AND LEISURE CENTRE

The new Gold Coast Sports and Leisure Centre is a world class, multi-purpose, indoor sporting facility, featuring a show court with a maximum seating capacity of 5,000 and up to 15 basketball/netball courts for community use.

During GC2018, the venue hosted the badminton, weightlifting and wrestling competitions.

The new centre supports a range of sport and community facilities including function rooms, changing rooms and administrative facilities.

The mixed-use sports courts are designed to accommodate a wide range of court sports including basketball, netball, indoor soccer and badminton.

CARRARA SPORTS PRECINCT REDEVELOPMENT

Architect: **BVN** Managing Contractor: **Hansen Yuncken**

The GC2018 signature venue precinct hosted the opening and closing ceremonies, athletics, badminton, weightlifting and the wrestling competition.

The redevelopment included the new Gold Coast Sports and Leisure Centre, upgrades to the **Carrara Indoor Stadium**, upgrades to **Carrara Outdoor Stadium**, and general precinct upgrades such as improvements to existing sports fields.

Construction commenced in February 2015 and was completed in September 2017.

Following the Games, Carrara will remain the home of the **Gold Coast Suns AFL** team and the precinct will cater for a wide range of elite competition, events and indoor/outdoor community sports activities.

BROADBEACH BOWLS CLUB

Architect: **Hamilton Hayes Henderson**; Contractor: **Condev Construction, All About Pumps, Hawley Constructions**

Major upgrades to the Broadbeach Bowls Club were completed in May 2016 in preparation for the venue hosting the lawn bowls competition for the Games.

The Broadbeach Bowls Club is recognised as one of Australia's leading lawn bowls venues, attracting major lawn bowls events to the Gold Coast including the finals competition of the **Australian National Championships** from 2015 to 2019 and the **World Junior Championships** in 2016.

The upgrade works included improvements to the four international standard bowls greens and major building upgrades to the clubhouse and surrounds to improve access and functionality of the venue for major events. »

Carrara Sports Precinct Redevelopment



COOMERA INDOOR SPORTS CENTRE

The new multi-purpose Coomera Indoor Sports Centre, located at Beattie Road in the northern Gold Coast, hosted gymnastics and the netball finals for GC2018.

It has a maximum temporary seating capacity of 7,500. The venue will now cater for community and national events, with an indoor arena that can incorporate eight basketball/netball-sized courts and a 1,500m² gymnastics facility.

The Coomera Indoor Sports Centre will be the centrepiece for the transformation of Coomera Sports Park into a significant elite and community sports precinct.

Construction of the new venue began in early 2015 and it was officially opened on 5 August 2016.

OPTUS AQUATIC CENTRE

Architect: **Cox Rayner Architects**; Managing Contractor: **Watpac**

Set within the beautiful Southport Broadwater Parklands, the Optus Aquatic Centre hosted the Commonwealth's best aquatic athletes at GC2018.

The A\$41 million redevelopment of the Southport pool complex, originally developed in the 1960s, was the first venue delivered for the Gold Coast 2018 Commonwealth Games and has provided the Gold Coast with a world-class swimming and diving facility.

Construction commenced in February 2013 and was completed ahead of schedule in June 2014 to host the **Pan Pacific Swimming Championships** event in August 2014.

Among the new facilities is a new 50 metre (10 lane) competition swimming pool, refurbished lane training and diving pools, and a new gymnasium.

The venue also boasts a range of community facilities including a new learn-to-swim pool, children's play pool, crèche, café and function rooms.

The Gold Coast Aquatic Centre redevelopment project was a joint funding initiative by the Queensland Government and the City of Gold Coast.

GOLD COAST HOCKEY CENTRE

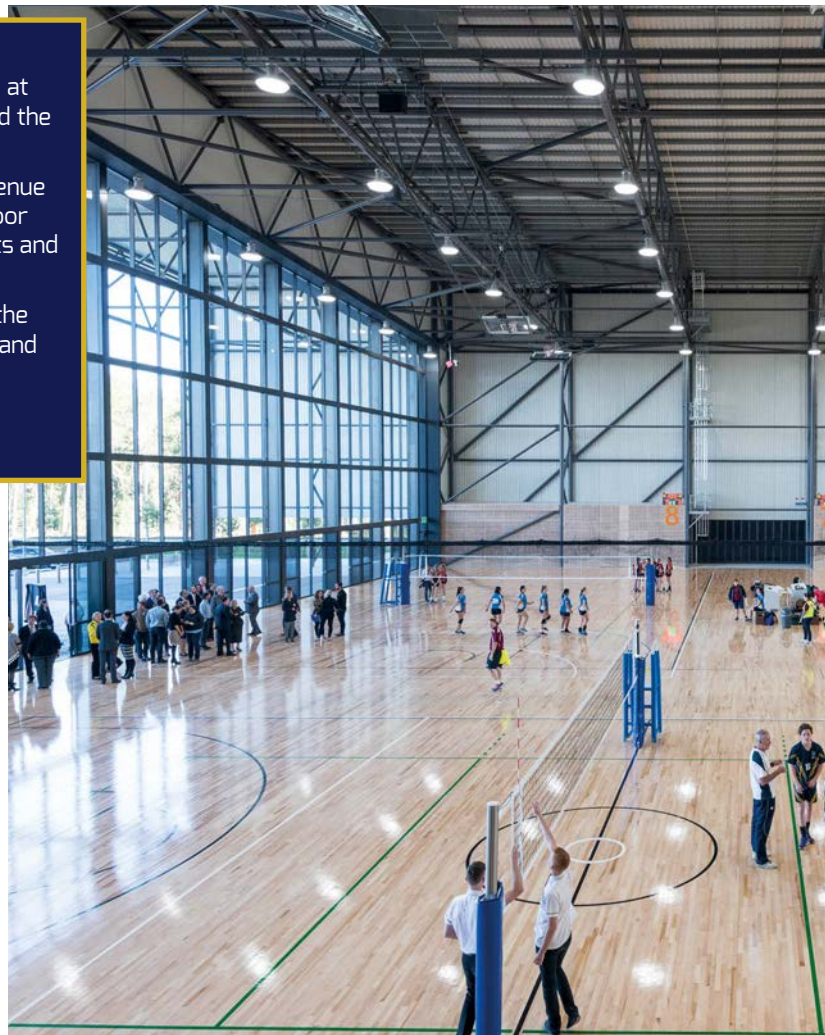
One of Queensland's premier hockey venues, the newly upgraded Gold Coast Hockey Centre is located in Keith Hunt Park, Labrador.

The Gold Coast Hockey Centre upgrade provides the Gold Coast with a world-class hockey facility that caters for elite training and competition as well as community use.

Key features of the venue upgrades included realignment of two synthetic hockey pitches to meet international competition requirements and major refurbishment of a shared clubhouse facility, including permanent seating overlooking the two synthetic pitches.

The Gold Coast Hockey Centre has a long-term legacy as a community sports facility that will also attract future elite hockey events and training camps to the Gold Coast.

The upgrades were completed in May 2017. The redevelopment was funded by the Queensland Government, Australian Government and City of Gold Coast.



CARRARA STADIUM UPGRADE

Carrara Stadium hosted the athletics competition and opening and closing ceremonies for the Commonwealth Games and will undergo a permanent upgrade of broadcast and lighting facilities.

The 25,000 capacity stadium also saw temporary upgrades for the Commonwealth Games, including an additional 15,000 temporary seats, to cater for up to 40,000 spectators during the event.

SOUTHERN SPORTS FIELDS

Three new multi-sports fields will accommodate a range of community uses including soccer, football and school carnivals. Other facilities include outdoor lighting, car parking, access roads, public amenities and a shared clubhouse facility.

CARRARA INDOOR STADIUM UPGRADE

The refurbishment of this multi-purpose indoor venue extended the community usage of this facility for the next 20 years and beyond.

The project delivered upgraded spectator seating, technology upgrades, new internal and external cladding, and a new roof.



Coomera Indoor Sports Centre

TEMPORARY VENUES

Temporary overlay also played a major role in the success of the Games.

The **Coolangatta Beachfront** provided a temporary location for the GC2018 beach volleyball. The stunning backdrop created iconic memories for those attending the event.

Seating for 4,000 spectators was provided across temporary stands which were removed after the conclusion of the event.

Oxenford Studios, which are normally used to make films, were adapted to host table tennis, boxing and squash.

BRISBANE - ANNA MEARES VELODROME

Architect: **Cox Architecture**; Managing Contractor: Watpac

The new Anna Meares Velodrome is located alongside the Brisbane Super X BMX Track at **Sleeman Sports Complex** and is a new centre of excellence for cycling in Queensland.

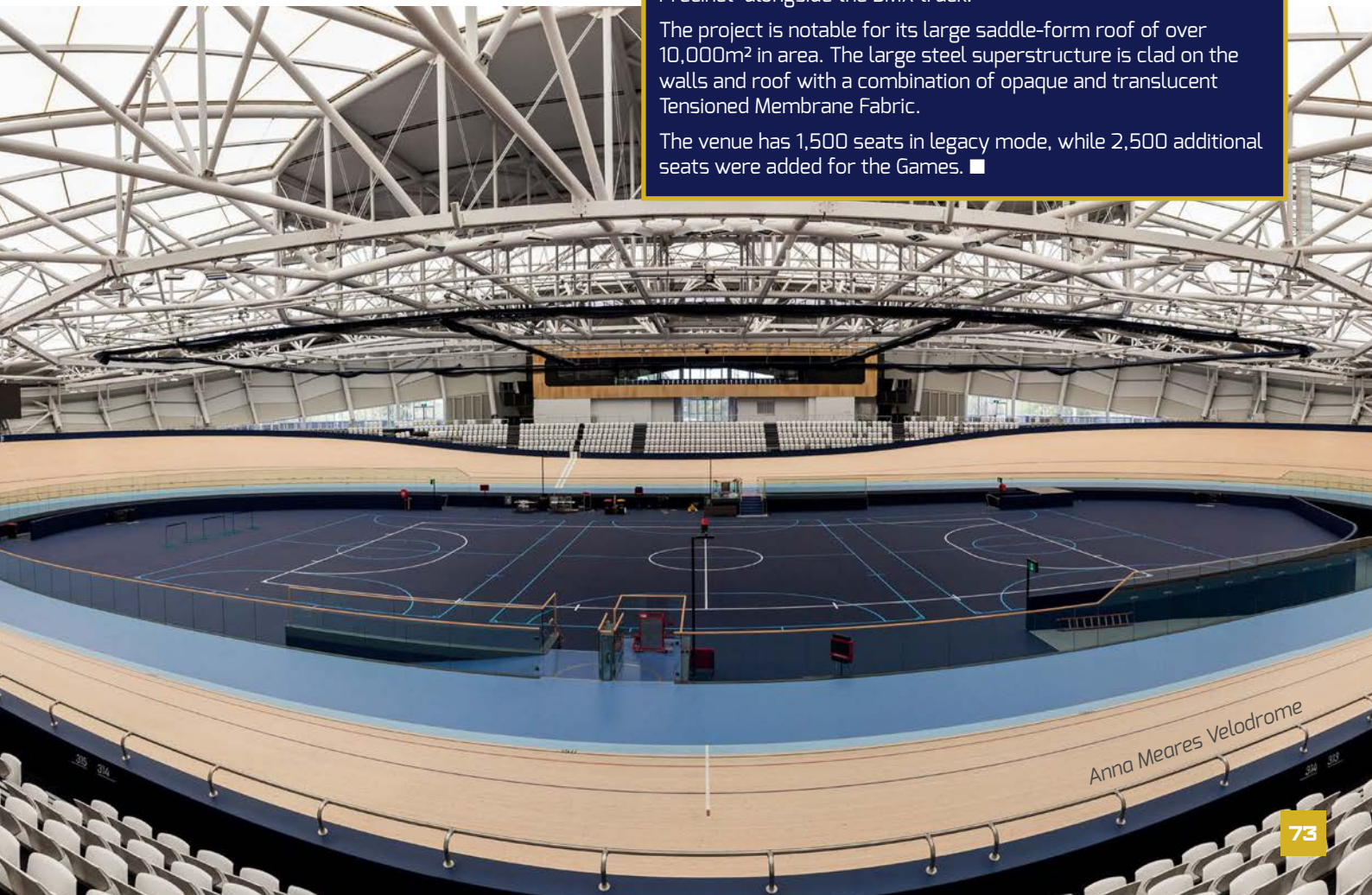
As Queensland's first indoor velodrome, this new world class facility will attract elite training squads and competition events to further the development of cycling in Queensland.

The velodrome was completed in September 2016 and will host the Track Cycling competition for the Gold Coast 2018 Commonwealth Games.

The Velodrome facility contributes connecting plaza spaces that augment and enhance the existing suite of sporting facilities at the complex, with a particular focus on the creation of a 'Cycle Precinct' alongside the BMX track.

The project is notable for its large saddle-form roof of over 10,000m² in area. The large steel superstructure is clad on the walls and roof with a combination of opaque and translucent Tensioned Membrane Fabric.

The venue has 1,500 seats in legacy mode, while 2,500 additional seats were added for the Games. ■



A SUSTAINABLE ICON

Inspired by the dynamics of cycling, the Anna Meares Velodrome was conceptualised as an engaging, efficient building, as Cox Architecture explains.

The Anna Meares Velodrome, won in competition in December 2013, was built for the **2018 Commonwealth Games** in the **Sleeman Sports Complex** to the east of Brisbane's CBD.

The latest addition to the Sports Complex in the Brisbane outer-suburb of Chandler, the Anna Meares Velodrome – named after Australia's most successful track cyclist and the most decorated female track cyclist of all time – was purpose-built by **Stadiums Queensland** to host the **2018 Gold Coast Commonwealth Games** track cycling.

This is the latest in a long line of **Cox Architecture** major sporting projects including the emblematic **AAMI Park** and Director Richard Coulson acknowledges the practice has a signature, of sorts.

"We have national expertise in sporting projects stretching back 40 years to Bruce Stadium in Canberra all the way to our recently won current work on the 25,000-seat North Queensland Stadium for the Cowboys in Townsville which will be home to the North Queensland Cowboys, but our local studios bring their own nuances to projects."

Coulson said the client brief for the new velodrome stemmed simply from the track needing to be enclosed. *"They of course already had an outdoor track so wanted this one covered,"* he said.

"A premium track was the centrepiece of the new velodrome so protection of

that from the elements, and to control the wind and temperature conditions that can affect cycling performance, was paramount."

The velodrome has a 250 metre timber 'wide track' designed to enable all styles of racing. It has 1,500 permanent seats which were temporarily expanded to 4,000 seats for the Games.

Following the Games, it will accommodate multiple indoor sports within its arena, and it is collocated with the Brisbane Super X BMX Track.

One of the unconventional aspects of the design is that the velodrome is naturally ventilated. This required highly specialist environmental design for the track surface by the German company **Sportbau Schurmann GBH**.

Inspired by the dynamics of cycling, the Velodrome was conceptualised as a sweeping, undulating roof form.

It lifts up towards the straights of the track where the greatest number of seats were required and pulls down at the bends where less seating was needed. The 117 metre by 113 metre span is covered by a fabric called PTFE.

It is opaque in the middle and around the perimeter, but translucent above the track to allow natural light to illuminate it. This feature and the natural ventilation system make the velodrome exceptionally energy efficient. For

evening, event and broadcast conditions a system of programmable LED sports lighting was installed. The venue is the first Velodrome in the world to install LED sports lighting.

Fundamental to the design of the velodrome was an economy of structure and systems focused on the principles of sustainable architectural practice. The design has capitalised on Brisbane's subtropical climate and its natural bushland setting.

"It's a very efficient building, given the scale and complexity of the roof. The roof benchmarks very well with a primary steel weight of less than 50 kilograms per square metre," Coulson added.

This is a significant achievement, given the scale and complexity of the roof, the unusually large wind pressures and the small weight premium that arises from the construction-led and holistic approach of connections designed for ease of fabrication and erection rather than purely minimum weight.

The shell action available from the doubly curved nature of the saddle-shaped roof minimised steel tonnage across the project.

Rigorous design and optimisation was carried out to ensure that the lightest available steel sections were used to minimise embodied energy while maximising the use of recycled steel. ■

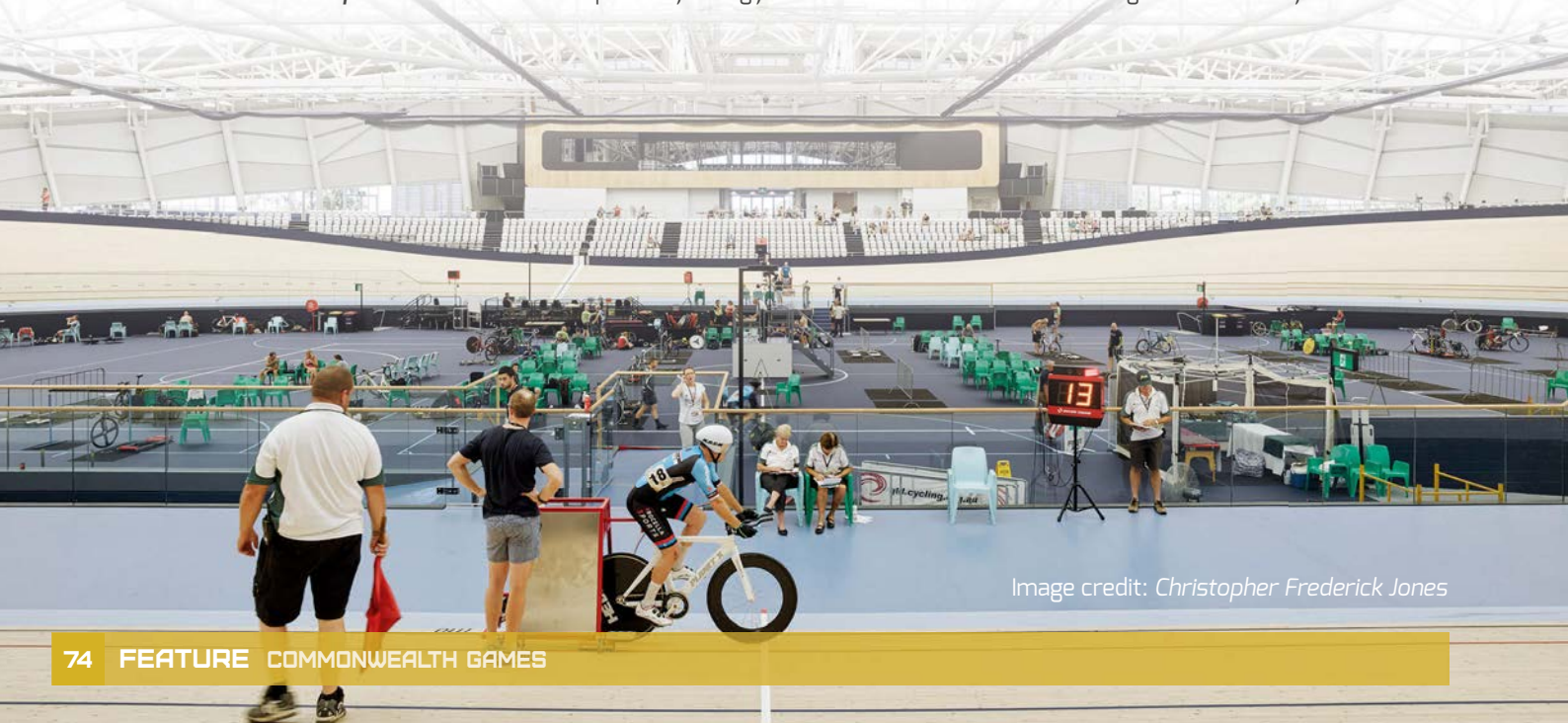


Image credit: Christopher Frederick Jones



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PROTECTING YOUR MAIN ASSET

Pitch protection systems are key to staging non-match day events and bringing in extra revenue for venue operators.

Uenue operators are always looking at ways of raising additional revenues from non-sporting activities.

Increasingly, stadia and arenas are being used to host concerts, trade shows and any number of live events from monster truck racing to graduation ceremonies.

But the operator must make sure that the main asset - the pitch - doesn't get damaged in the process, and pitch protection systems are employed to make sure this is the case.

Mike Boekholder, Director of Field Operations for the **Philadelphia Phillies** at **Citizens Bank Park**, told *P5&AM* how the venue copes with all the non match-day events.

He explained: *"We typically host a wide variety of non-baseball events, with the vast majority of these being corporate batting practices, kids camps and clinics, corporate "walk the bases" or "walk the warning track" type activities.*

"On any given year, we will see one to three concert setups that require covering the field with flooring. Managed properly, we can get through these events typically with minimal impact to the playing surface.

"In a normal year, we will see substantial recovery to the grass within 10 days or so of the stage being removed from the field. Our goal here is to do as many extra event activities that we can while maintaining the high quality surface Citizens Bank Park is known for."

LIGHT TOUCH

Boekholder said the majority of "large impact" events at the ballpark are concerts and that everything possible is done to book shows that are willing to utilise a lighter-weight staging system (typically, a unit from G2 Structures) that has a much lighter impact on the field than other stages.

He added: *"It is easier to set up, faster on the install and removal and requires less manpower and cranes than other comparable roof systems. Utilising this type of roof and stage setup goes a long way in preserving the quality of the playing surface. It really has been a game-changer in the concert business for the baseball stadium.*

"We exclusively use TerraPlas flooring for our field protection cover, provided by TerraPlas USA. They give great

service and support, have great install crews and a proven product that performs each and every time.

"Enkamat Flatback, from CoverMaster in Canada, is used under many of the high-traffic areas of the floor (i.e. front of stage, load-in and load-out areas, etc.) to help minimise footing damage the TerraPlas systems can cause when faced with highly-concentrated foot and equipment traffic. The combination of the TerraPlas with Enkamat really does do a good job keeping the grass in good condition and helps it recover much more quickly after concerts. We also use the Enkamat product under our stage footers and tower touch points."

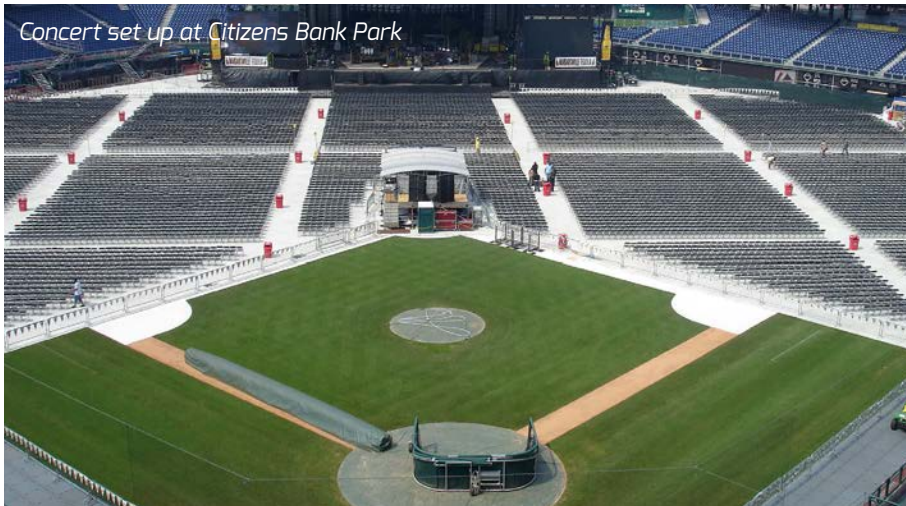
FLEXIBLE FRIEND

Boekholder said flexibility is always key in hosting extra events and that stadia operators have to have systems and equipment that allow them to adapt to the needs and requirements of any given event or show.

He added: *"Without modern field covering systems available to us, I highly doubt we would be in the concert business in Philadelphia. The weather is just too hot and humid mid-summer*

Kids run the bases at Citizens Bank Park





Concert set up at Citizens Bank Park

to ever support doing shows with older, out-dated methods such as EnkaMat with geotextile fabric coverings."

The quick installation time of a field protection system also adds to its attractiveness for use.

"We have an outstanding installation process in place here in Philadelphia. With the assistance of a local landscape contractor who supplies our labour, we can install the entire flooring system over the grass in around four hours. Our drivable flooring system on the warning

track typically takes around two hours to install.

"Removal of the field covering typically takes around four hours as well, with the warning track coming up in about 1.5 hours or so," Boekholder added.

"While we are very aware of our installation and breakdown costs, the more important consideration for us is installation and removal speed. Putting the floor down as late as possible before a show and removing it as quickly as possible after

a show are key to keeping the field in good condition.

"We would rather pay a bit more for good labour that is fast and efficient, than try and save dollars on labour that takes significantly longer to install and remove the field covering products."

He said that anytime you can bring additional revenue opportunities into your venue, that's a positive for the overall facility bottom line, adding:

"Using flexible systems, from flooring to stages/roofs that cause minimal field issues, allows us to move forward with a greater level of confidence that our primary business, Major League Baseball, and extra events can co-exist well together.

"If extra events were to significantly compromise the quality of the playing surface, it would make doing these extra events a much more difficult decision. As it is, we can move forward with a high degree of confidence that we can do both and still provide a high quality surface for our players." >>

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Arsenal in action at Emirates Stadium

« EMIRATES STADIUM

At London's **Emirates Stadium**, home of **Premier League** club **Arsenal FC**, less use is made of the pitch for non-football events during the year, but good protection is still essential.

Stadium Manager John Beattie said:

"The club can host three non-football

events in a calendar year.

These events are scheduled so that the pitch can be reseeded and grown in for the pre-season games.

"The club has hosted several concerts over the last 10 years and the surface is protected with Terratrak plus."

Beattie also said flexibility is key as this allows the venue to host different types of events with the knowledge that the surface will be protected throughout.

He added: *"The system takes three or four days to to install*

and 24 hours to remove, the time can be reduced further if required with additional manpower.

"With the addition of a pitch protection system it allows the stadium to be flexible on when they host events as it is not affected by supply issues. If the club/company owns the pitch protection they will recoup the rental fee for each event and can also rent their system out, which will increase revenue when the system is not being used.

"It also allows for a system to be designed for the needs of that stadium/venue and around any business plan, for example events in the season may need more pedestrian grade flooring than events at the end of the season." ■



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www.saevents.uk.com



Conference Programme and Early Bird Registration will be available early July. To reserve your place, please email s.wibrew@hgluk.com.

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“ *We were very excited to obtain a lot of invaluable industry knowledge from attending the event and to start to develop key business relationships with people in the sector from around the world.* **”**

Esti Adnan, President Director, Jakabaring Sport City,
Indonesia (host venue for 2018 Asian Games)

“ *Stadia & Arena has delivered another successful conference in Tokyo this year for the venue industry. From my perspective it has been a great opportunity to connect with other venue professionals and those connected with the industry from around the globe. It has been great to share knowledge as well as learn new things, and to discuss issues, trends and opportunities. I'm looking forward to the 2018 conference already.* **”**

Darren Burden, Chief Executive, Vbase

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PROPLAY® REACHES NEW HEIGHTS IN BOLIVIA

The highest altitude FIFA Quality Pro certified pitch has been installed by Schmitz Foam Products in Bolivia.

The highest altitude ProPlay® field, located in **Estadio Municipal Villa Ingenio** in the municipality of El Alto in Bolivia, has been installed.

El Alto is the highest major metropolis in the world, with an average elevation of 4,150 metres. It makes this field the highest altitude **FIFA Quality Pro** certified pitch in the world.

It is also the first synthetic turf field with a horizontal drainage system in Bolivia, using the 23mm ProPlay® shock pad with an outstanding drainage capacity.

El Alto (Spanish for "The Heights") is the second-largest and youngest city in Bolivia, located adjacent to La Paz in Pedro Domingo Murillo Province in the Altiplano highlands.

Today, El Alto is one of Bolivia's fastest-growing urban centres, with a population of around 1 million people.

RAPID INSTALLATION

Estadio Municipal Villa Ingenio is the first modern stadium in Bolivia and has a capacity of 25,000 spectators. The Bolivian Government allocated 55.8 million Bolivars for construction, which is about €6.6 million.

The stadium covers 22,850m² so there is plenty of room for other sports. This mainly benefits the children and young

people of the city, since they have a place for training and entertainment.

The municipality of El Alto was highly satisfied with the speed of installation. Temperatures in El Alto vary between -17°C and 18°C which can make installation a challenge.

This, however, was no problem for the professional installation crew which completed the job in just two weeks.

ProPlay® panels are puzzle shaped and therefore easy to install in all weather conditions.

The stadium was officially inaugurated by Bolivian President Evo Morales in Villa Ingenio.

It was premiered by the teams of 'Bolívar' and 'The Strongest' in a classic 'paceño'.

"Brothers and sisters this is a small gift not only to the people of El Alto, but also for the people of La Paz and fundamentally for the Bolivian people," the President said after an inaugural kick-off.

The realisation of the high quality field was a collaboration between

Greenfields

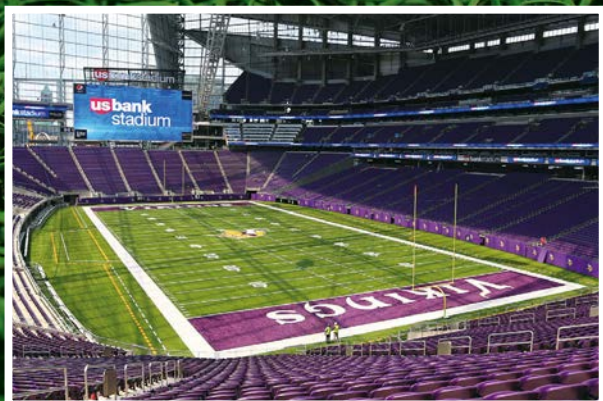
(who provided the high quality synthetic turf) and **Schmitz Foam Products** (who provided the high performance ProPlay® shock and drainage pad).

The collaboration resulted in this world-class synthetic turf FIFA Quality Pro certified system with excellent playing characteristics, with great coverage and durability.

ProPlay-Sport meets the highest quality demands set by professional sports associations, such as **FIFA, FIH, GAA, AFL** and **World Rugby**.

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LUZHNIKI PROTECTS WITH TERRAPLAS

Russia's Luzhniki Stadium, which will host the 2018 World Cup Final, trusts its pitch to Terraplas even at minus 20°C!

Having taken delivery of their **Terraplas** Turf Protection system in early 2017, the prestigious **Luzhniki Stadium** in Moscow has made great use of the special event opportunities **terratile®** and **terratrak plus®** provides for them.

After four years of reconstruction, this iconic sports complex was opened on 1 November 2017 and held its inaugural event three days later, a concert-rally in honour of the "National Unity Day of Russia" holiday, which was attended by 95,000 people.

"The fitting of this versatile product combination on the natural football field at BSA [Luzhniki] was supervised by experts from Terraplas and "RS-arena Components" [Russian representation of Terraplas Distributor Raita Sports Oy].

"Allowing for installation, the event period and dismantling of all the equipment, the total period of field coverage was four days, with the Terratrak Plus also being down for four days. Given the poor November weather (average temperature +2° C with rain) – the turf protection demonstrated excellent results in terms of easy installation and protection of a quality football field," explained Luzhniki's Chief Agronomist, who went on to say:

"Having an excellent team of agronomists and technologists to deliver a quality pitch after the concert on 04 November, was vital in being able to prepare and effectively accommodate the football game between the national teams of Russia



and Argentina on 11 November. After the match everyone was happy with the quality of the football field."

Praise indeed from very happy stadium staff and patrons!

It is this sort of turnaround that is so vital to stadiums around the world and why it is imperative to have the very best quality products to protect their pitches.

In February 2018 Luzhniki was set a real challenge! To host an event in the stadium at temperatures that were likely to be between -2°C and -20°C.

After consultation with Terraplas, who gave them strategic and technical advice, Luzhniki decided to go ahead.

The system was fitted from noon on 28 February with the temperature at -20°C!

After the tiles came the stages, catwalks, grand entrance tunnel and all the hoardings that come with a large-scale event.....followed by a good covering of snow!

After the stadium and pitch area was filled to capacity with patrons for the rally on 3 March, the system was removed. The last of the tiles were

lifted around 18:00hrs on 4 March with the temperature rising to a 'positively tropical' -7°C.

After lifting there was some maintenance to do – as had been previously advised by the Terraplas Technical Team, but much less than had been predicted.

The grass had even continued to grow under the tiles and snow – despite the limited light penetration, because the cover system was fitted for as short a period as possible.

Some 18 days later, Luzhniki hosted a **World Cup** control match between Russia and Brazil, and whilst the home team was unable to overcome the Brazilian national squad, the Terraplas Turf Protection had performed extremely well, in really difficult conditions, leaving the pitch in great playing order for this home international.

The reputation of Terraplas and the proven performance and lifespan of their products by far offsets the initial cost difference - Quality materials, first class support and unrivalled expertise are absolutely key. ■



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AFTER THE FINAL WHISTLE



Volker Kirsch, director of sales and stage technology at Bosch Rexroth, explains how a new removable pitch system can help stadia maximise revenues.

In the past, the need to protect the pitch has prevented sports stadia from staging other revenue-making events. But not anymore.

The winning goal is scored, the final whistle is blown and the fans go home. What happens to a major sports stadium then?

Generally, the ground stands empty and silent. Not only is this a shame, it's also a missed opportunity, as a major city sports stadium has many of the prerequisites for other kinds of crowd event.

It can hold tens of thousands of people; it has on-site facilities to match this capacity; it is necessarily compliant with health and safety requirements; and it has good transport links. In spite of all this, for hundreds of days a year it sees no activity and earns no income, because no one can risk damage to the all-important turf which needs time to recover after each game.

Of course, stadia with either real or artificial grass have many potential uses. One obvious one is music concerts. Another is transformation into a venue for another sport, such as car events, speedway or even monster truck festivals.

All of these events are highly attractive to stadium owners as they have the potential to sell thousands of tickets while also gaining revenue from car parking, on-site catering and other merchandise.

SMART BUT NATURAL

Technology in which **Bosch Rexroth** is playing an active role aims to help create a seamless changeover for other events to take place.



Test Application Site at STRI Headquarters in St. Ives, Bingley UK

StadiaPitch is a joint initiative between **Nutcracker Solutions**, **STRI**, **sapa** (now part of **Hydro**) and Bosch Rexroth that allows the pitch surface to be removed between fixtures, revealing a concrete sub-surface on which other events can safely take place.

The pitch is divided into 192 trays of real turf. When they're in use, the pitch is seamless: no one can see or feel the joins, not even those in action on its surface.

When the 4.5m x 9m turf trays aren't in use, they're then stored in climate controlled growth chambers, where they're given the light, temperatures, ventilation, humidity and irrigation they need to keep the grass in optimum health.

The growth chambers can be located anywhere, e.g. in an extra building close to the arena or below the grandstand.

As you might expect, we're heavily focussed on the hydraulics and controls that govern the automated systems that assemble the playing surface, as well as in the overall R&D, and in the provision of a global sales infrastructure for the project.

As part of StadiaPitch we're particularly focused on maximising the benefits of

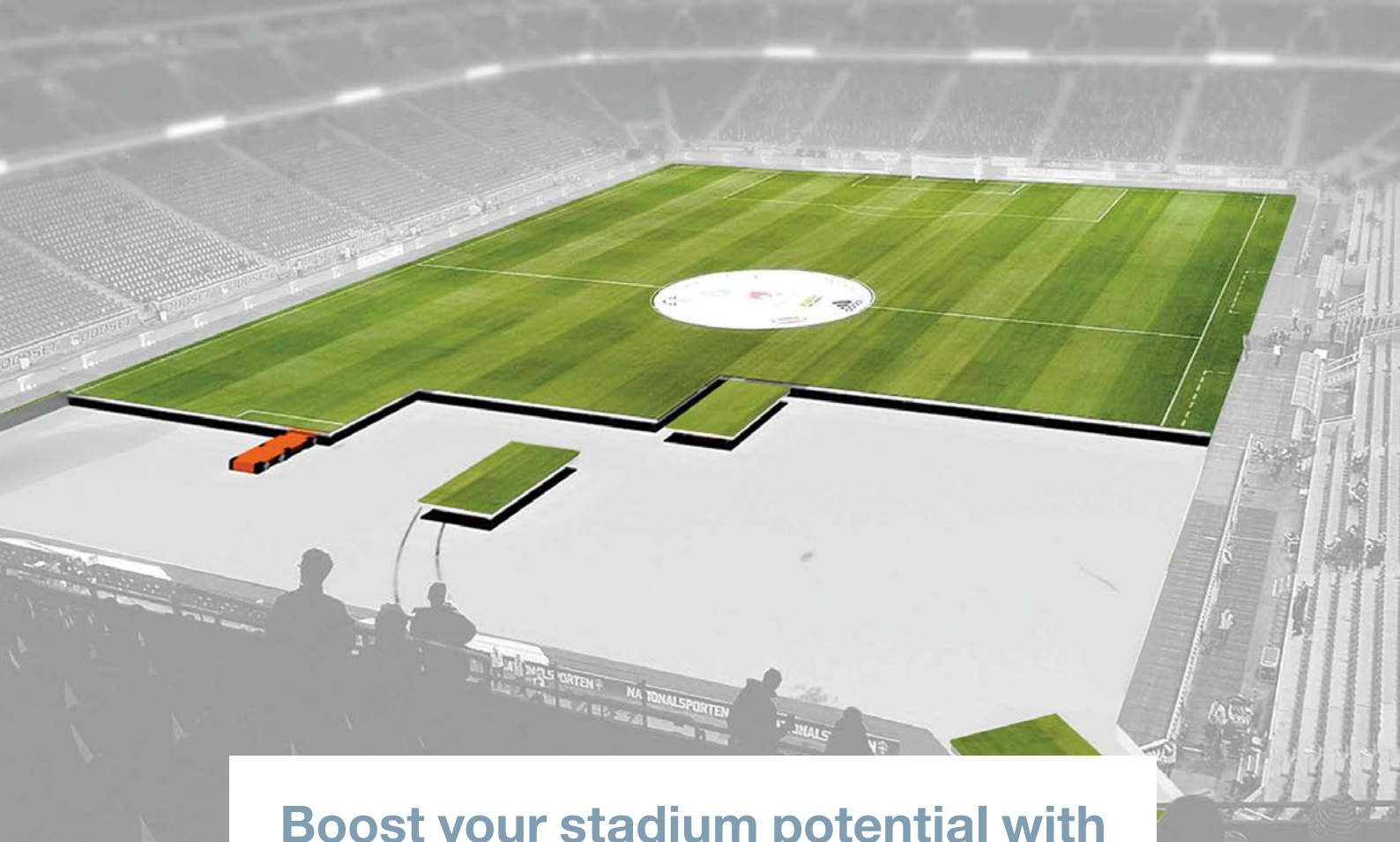
the storage chamber approach, as well as on what happens at the edges of each turf module – because these are of course crucial.

It's not just that they must create imperceptible connections: they also need to be sufficiently strong and flexible to withstand whatever action or weather comes their way.

Based on extensive experience in the control and movement of heavy loads, the Rexroth team also proposed the use of autonomous, fully automated lifting vehicles to move the trays between the stadium and the growth chambers via the main access to the playing area.

Equipped with an extensive range of state-of-the-art sensors and drive and control technologies, these vehicles can each lift up to 40 tonnes and move in any direction at speeds of up to 3 m/s without the risk of collisions with stadium walls, people or vehicles moving nearby, or each other. Most importantly they can reposition the modules to accuracies of $\pm 2\text{mm}$.

While we continue to fine-tune our R&D, we've been talking to stadium owners worldwide who see the potential of a perfect and natural playing surface that can be removed at will to create new revenue-making opportunities. ■



Boost your stadium potential with

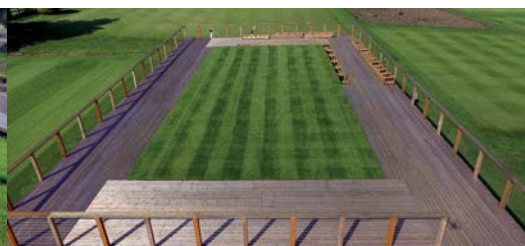


After 5 years of grass research, pitch testing and product development, we are proud to present the StadiaPitch – the world's first automated pitch changeover system that reduces the changeover time between sports and concerts from weeks to hours. At the push of a button, the stadium operator can switch between a natural hybrid grass sports pitch, that meets the highest playing quality standards, and a concrete floor suitable for events. It can be installed in most new and existing stadiums.

A StadiaPitch will turn your sports stadium into a multipurpose stadium. It will boost your stadium potential by making all non-match days bookable. A StadiaPitch also gives you the ability to manage better and more easily many aspects of playing surface quality. It will be a commercial game-changer for your stadium!

Visit us at the StadiaPitch Demonstration Centre or at stadiapitch.com

The StadiaPitch supply partners



TECHNOLOGY REVOLUTION

New technologies being introduced at stadia and arenas are improving customer satisfaction and boosting the bottom line.

Advances in technology are helping venue operators connect more with their fans through loyalty programmes and other offerings, while better point of sales technology is also helping to smooth the fan journey.

Venues have been working hard to ease queues at merchandise and food and beverage outlets during busy periods, while giving fans added value through targeted offerings.

Roy Yaoz, CEO of **Triple Jump Technologies**, which has experience of working at a number of prestigious venues, told *PS&AM*: *"Technology offers freedom. Sure it brings the venue commercial benefits and improves the fan experience, but more than any other thing it delivers freedom. The freedom for every fan to enjoy the match their way. It is about making everything just right for every guest – not telling them how things should be done – but allowing them to choose the things that make them happy."*

"The customer journey should be familiar, comfortable to the guest and the way they normally interact in their normal daily lives. Why should going to the stadium offer a different experience to a shopping centre or a restaurant?"

"If the guest normally pays by Apple Pay, this should be an option. If they want to pay on the day or on account, nothing is impossible. If the guest gives their box to someone else, our technology makes it simple for the new

occupant to treat the box as their own, from personalisation to payment.

"Technology makes lives easier – easier for the fan, easier for the venue."

Yaoz said all this choice must not come at the cost of operational excellence, however.

"This is fundamental. Triple Jump Technologies are working at the national stadiums of a number of different sporting codes to balance the optimum guest experience with the effective management of the site."

"We do this by considering the full lifecycle of operating a venue. This is why our relationship with venue strategists Forward Associates is so important as it means the design of the kitchen can be planned with our technology in mind."

REVENUE GENERATION

Through the use of real-time data, predictive analytics, web and mobile technologies and robust back-office automation, Triple Jump have revolutionised the way venue operators manage, track, protect and increase revenues.

Yaoz said: *"We are not replacing incumbent technologies in the venue but connecting them. Rather than disparate retail and digital systems, our skill is bringing them all together to form one truly connected venue platform. The upside is huge and enables*

central management of data, business processes and customer engagement.

"Stadiums are complex – from the matchday to day-to-day to major events. There are so many different requirements that must co-exist together."

"We are increasingly working with venue strategists to create end-to-end solutions. This is where we can add great value by getting food and beverage and technology to work together."

"This is smart technology. A data-centric, mobility-driven, real-time venue management platform which increases profits and improves the fan experience. This is technology for an unparalleled fan experience."

The same technology that improves the hospitality offer works equally well for general admission.

Yaoz added: *"This is what makes it so exciting. It takes away the them and us. It is truly democratic. The accepted wisdom is that some fans are more valuable than others. The hospitality crowd generate the most income so they should get the best experience. But is that a true reflection of what's really happening?"*

"The loyal fans that turn up week in week out set the tone. They are the ones that make the atmosphere, inspire the team to greater heights. Triple Jump Technologies are football fans. We

believe the GA fan should be able to pre-order food and drink at half time to collect from a pre-arranged location. This is the future we offer. Loyalty should be rewarded."

GAINING TRACTION

Yaoz said getting guests to fully embrace in-venue apps is a challenge. There remains a reluctance from the guest. This is due to a number of different factors – including poor marketing of the service, inferior quality or just general app fatigue.

In response Triple Jump Technologies have developed Ultra. It is the industry's most advanced guest experience app, delivering a 360-degree digital experience. Features include in-app ordering and integrated payments for food and drink, merchandise and sponsored products.

It offers indoor wayfinding and venue mapping from **Google** Maps, including video and rich media content – all of which can be integrated to the venue's content and location services systems.

Yaoz added: *"In a nutshell it offers the personalisation of any space without the need for revolution. Ultra takes the standard app and makes it unmissable. It controls all media, uploading any content to the screens in the guest's suite to start building the atmosphere. It offers music streaming, the ability*

to change lighting, temperature and so much more.

"Embracing digital technology removes the obstacles that get in the way of customers spending money."

LOYALTY PAYS

SKIDATA Loyalty is another platform enabling venues to develop and operate their own loyalty programme.

The platform helps motivate visitors to use special services. Fans can register for this solution and can earn points for all interactions, online or on-site: for example, if they buy tickets over the website of the club for the purchase of merchandising products or for arriving early at the stadium.

The loyalty points earned can be exchanged for services that fans have selected. In this way, fans can enjoy products of the club like merchandise as well as products that money can't buy: from a 'Meet & Greet' with the team, experiencing a game in box seats, or a special guided tour of the venue.

Sébastien Pignot, IT and ticketing manager at **Nancy Lorraine FC** in France, told **P5&AM** that the club is using the programme to boost fan engagement.

He said: *"The programme reinforces the value of coming to the stadium and consuming available products and associated services. It is also an emotional catalyst thanks to the*

ability to participate in exclusive opportunities that could not be purchased otherwise. It really increases customer satisfaction."

Pignot stressed the importance of getting to know customers better and influence their behaviour and habits.

"The programme helps to promote interaction and reinforces the fan's relationship with the club," he added.

Meanwhile throughout the summer SKIDATA will not only be present but right in the thick of the action as an access expert at **World Cup** stadiums.

Technology from Salzburg will provide up to 800,000 football fans from around the world with quick and safe access to 12 World Cup matches at the World Cup stadiums in Moscow and the Austrian access experts are well-versed in major sporting events.

SKIDATA has been involved in all World Cups and European Championships since the **2004 European Championship** in Portugal.

SKIDATA AG CEO, Hugo Rohner said: *"Fast and safe access is a key issue for stadium operators, especially with the high volumes of spectators seen during a World Cup. »*



Venue access technology in action



« "SKIDATA access systems are more than capable of meeting such lofty requirements, worthy of a world champion, as proven by the speed record it set in 2014 : in just one hour, 2,033 people passed through a SKIDATA gate, which secured the title of the 'world's fastest access system.' "

MIDDLESBROUGH FC

Speed of service is also now a highlight of a trip to **EFL Middlesbrough FC's Riverside Stadium**, where **Bleep PLC's** EPOS equipment has been installed.

Kieron Wilson, Operational Cost Accountant at the club told *PS&AM* what technology is installed.

He said: "Middlesbrough Football Club have 107 Epos units that span across both our concourse and hospitality suites. The concourse units are 10.1-inch screens all equipped with 7-inch LCD advertising screens, Loyalty RFID scanner and PDQ machines.

"The hospitality suites have 15-inch screens due to the expanded product range and three of our suites operate using handheld ordering pads

"Speed of service has improved dramatically and complaints regarding long queuing times are now virtually non-existent even over the half time pinch point.

"The biggest service improvement, however, was the introduction of credit/debit payments to the stadium. Previously the closest ATM to the stadium was a 10 minute walk away. Finally the RFID scanners allowed us to integrate our entry to the stadium and the clubs unique reward scheme for season card holders. 12,000 season card holders are entitled to a free drink (Pint, Soft Drink, Wine) per game."

Wilson said fans have embraced the credit and debit card payments on the concourse and Middlesbrough FC have seen a steady increase in the amount of credit/debit card transactions over the two seasons that they have now been implemented. Internal adverts i.e. club shop sales onto the concourse tills have also helped to drive revenue in other departments of the business.

He explained the challenges involved in implementing the new technology.

"The biggest challenge was time. At the beginning of installation Middlesbrough were returning to the Premier League for the first time in seven years. Premier league requirements meant a large capex investment with various projects all running alongside each other.

"Bleep were fantastic when it came to the organisation and delivery of the project. More impressive was the relationship and development time of Bleep and Fortress GB to have our reward structure in place for our first Premier League game."

And he said it has helped improve revenues. "The bottom line for the catering department of the club has improved. We can now take more revenue than previously, with increased speed of service and the introduction of credit/debit card



payments. However the biggest bottom line gains have been from improvements in COS.

"The analytical data that we now possess has moved the club onto a different level in terms of setting par stocks, reducing wastage and streamlining our labour demands. I firmly believe that Middlesbrough FC operates one the best catering operations in the UK." ■



A woman with long brown hair, seen from behind, is holding up a smartphone to take a photo of a stadium. The stadium is filled with spectators, and there is a lot of yellow and red confetti falling in the air. The scene is brightly lit, suggesting a sunny day or strong stadium lights. The woman is wearing a yellow t-shirt. The background is a blurred view of the stadium and the crowd.

DRIVING FAN EXPERIENCE ...

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If you can dream it, we can integrate it. SKIDATA has partnered with over 40 teams across sports leagues across the globe. Reach out today to learn more about making game-saving leaps within the world of big sports data.

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CHANGING TIMES

In this Live Events in Focus roundtable we quizzed Damian Bush, Senior Director of Venues & Events at Singapore Sports Hub; Darren Burden, CEO of Vbase; Nick Sautner CEO of Eden Park; and James Anderson, Commercial Director at Arena UK & Europe, about the changing dynamics of the live event experience.

What are some of the conflicting requirements of live events between clients, cities and venue operators and how do you manage them?



In a nutshell, clients want venues that are easy to deal with and to make a return; cities want events to deliver visitation and a sense of vibrancy; and venue operators want to deliver a great experience to ensure repeat business and, similar to the client, make a return. Sometimes it is easy to align each of these objectives and I'm sure we can all think of great events where the client went home happy with money in their pocket, there was a big economic return to the city, the customers had a great experience and even the venue operator made some money! However, aligning these objectives for the majority of live events takes some careful management particularly around the setting of realistic expectations from the start and working as a team.



Damian Bush



Darren Burden



Nick Sautner



James Anderson



It is inevitable that bringing a lot of temporary infrastructure into a venue within a busy city will cause a level of disruption to either the venue itself and/or the city. As an event supplier, it's essential for Arena Group that the 'get in' and 'get out' are meticulously planned and executed as efficiently as possible. Another conflict can arise when clients want prime positions in cities that will look great in photography or on TV, which will in turn benefit the city from a tourism perspective, but can cause inconvenience and disruption to businesses and the public passing through those areas. For example, when working on the London Olympics there was a requirement for a 15,000 capacity

beach volleyball stadium on the Horse Guards Parade. With many of the events we work on being large scale events that attract hoards of fans, it is important that the city considers its own resources for elements such as transport, security and other infrastructure.



In order to stay ahead of the curve, venue managers need to challenge the traditional approach to venue operations and contemplate how to deliver products and services in a manner that will:

- Provide a sustainable financial model;
- Improve the overall patron experience;
- Eliminate duplication and inefficient



A drone racing course at Eden Park

processes; Encourage a culture of innovation, particularly by promoting social media strategies to engage new patrons to the venue; Enhance the quality of hospitality service and offering executed; Evaluate current business activities; Obtain a greater variety of content to attract broader market presence; Reduce operating costs to make events cost compatible with new entertainment offerings



The dateline is always critical and can sometimes cause an issue, particularly with the ever increasing demands on the calendar. International music acts don't always have the flexibility and this can cause challenges with securing some acts which is not uncommon across the globe. Sports events similarly have datelines for major tournaments and the international sporting calendar can be difficult to navigate.

The live event experience is continuously evolving, but what trends do you see emerging over the next few years?



Extending the day with spectator zones and making it a longer event is one of the trends we are seeing now.

Also the cross over between sport and music is getting ever closer. Consumers have higher demands and more expectations, the days of turning up for a major sporting event a few minutes before kick-off are changing and has to change. To do this then you need to have an offering and venues needs to support the event with retail and quality food and beverage options outside of the venues to provide greater choice. Venues have to be a destination and not just a function, this makes the whole package more attractive for the promoters and the patrons. You also need space around your venues to support the temporary overlay and permanent utilities to keep costs down. All these options are factors in reducing cost and providing a desirable venue for live events.



Technology has been a key topic over a number of years now, and more recently security has become prevalent due to incidents such as the Manchester Arena bombing. However, a trend that is getting more traction is the emergence of e-sports. It's difficult for people of my generation to get our heads around it, but you shouldn't underestimate how large the gaming community is and having recently attended the Intel Masters Games in Sydney it is clear that fan engagement at these events is high. Those who operate within this sector are the first to say from an event perspective it is still evolving and it hasn't quite reached a point where there is broad appeal outside of the gaming world. If this happens the audience size could be huge. How this translates for the live event experience over the next couple of years will be interesting.



A key challenge stadia are faced with across the globe is the increased competition for eyeballs arising from the sale of broadcast rights, plus the

distribution disruption and changing consumption patterns via mobile and tablet technology. The need, and time, for stadia to receive a percentage of broadcast revenue and advertising revenue derived from virtual advertisements specific for broadcast markets, is now. Stadia are reliant upon ensuring ongoing utilisation given the infrastructure investment. A willingness to be nimble and responsive to market needs is required.

A focus on both the event and non-event day engagement is critical to maintain 365 days a year revenue streams. This enables venues to provide benefits and an ROI associated with their activities. Value creation and perceived benefit is critical to retention. Creative and non-traditional usage of facilities including office tenancies, film production, university examinations, team building exercises, tours, religious and community festivals and car-parking along with functions provide much needed annuity revenue.



From our perspective as a turnkey event partner we are seeing growing appreciation in our expanding ability to deliver a wider scope of capability from one point of contact. This is increasingly becoming a key requirement of the organisations we work with. In addition to this, creating better opportunities for sponsor engagement when providing temporary infrastructure to events has been increasingly important to our clients. As a company we're able to use our scaffolding capabilities to create clad advertising walls, which were most recently seen at the BMW PGA Championships but are used widely across many of the events we support. Creating opportunities for technology to be integrated into the live events is a further emerging trend we are seeing. Beyond this, there is a real move to ensure the public attending your event experience a great all round experience.

What impact will that have on venues and the way we design and operate them?



A focus on introducing new non-traditional stadia activities to leverage assets is critical. >>

«Eden Park has a rich sporting history and its global profile is unmatched by any other stadium in the country. Content is king and like any business, a willingness to facilitate ease of use is paramount.

Current stadia infrastructure and the traditional design of function facilities and corporate suites are dated and provide a challenging business model to overcome. These spaces need to be transformed into shared office spaces to house start-ups and new businesses, as well as facilities such as community childcare centres that can drive revenue and cross-promote each other.

Few stadia can derive their revenue solely from their current event calendars.



Increasingly I believe venues will be designed that have flexibility to be extended seamlessly when there is a need to increase capacity to

host a world class event. This will enable a greater number of fans but also the ability to accommodate both national and international broadcasters.

Whether as a permanent possibility in a venue or as part of temporary infrastructure, venues will have a broad suite of retail, culinary and additional experiences to create unique memories for fans. This will also help venues and events maximise the value of the fans extending the duration of their visit.



The future of live sports comes into question with the advent of e-sports. I don't believe sports where there are tribal followings, such as NBA basketball, Major League Baseball and football in Europe, will be affected too much. As such demand for high quality stadiums and arenas enabling high levels of fan engagement will continue to be in demand. However, sports or leagues that are struggling with attendances could be impacted, and in some cases quite badly. Lesser demand for these types of events could see a trend for downsizing in stadiums or arenas with venues becoming more specific to e-sports needs. Connecting fans to the event who are not in attendance will also see a change to broadcast. Rather than watching a grand final on a free to air or satellite TV channel, much larger audiences will be watching through on-line channels. Venues will need to consider how they make themselves



appealing to those on-line audiences and how they engage with them to attract them to the venue for the next event.



The technology and power required is ever increasing, the support venues need to give for rigging and speed of use has to be paramount in design. LED lights and superior house sound systems are becoming common place as the sports event is becoming a music based experience as well. We hold around 30 concerts each year at our Singapore Indoor Stadium which is an arena that has 12,000 seats and we are retrofitting to meet the demands being placed upon us by our users. You have to be careful that you don't just become an app based experience and remember that consumers' needs vary, so not everything should be devoted to the digital age. Patrons still need to be supported by human interaction and we are a "people industry" so we need to remember this as we advance into the future decades. We are very fortunate in Singapore as we support our facilities with a retail centre/waterside dining and multiple community attractions. This is a higher end example of the consumer experience but we are seeing many countries taking the Singapore blueprint and trying to develop a similar offering.

How do we create unique memories within the event experience?



At Vbase, the venue manager of venues in Christchurch New Zealand, we have a concept called Vbase Touch. This is

effectively a guide book on all the touch points with customers for each type of event that we deliver, be that a convention, concert or sports event. This provides a list of added value elements that we can provide to an event to surprise and delight the customer. Most of these are not that expensive to do, such as free sunblock on a hot day or branded ponchos when it rains. We also get creative when we have major events, so as an example when we hosted Cirque du Soleil at Horncastle Arena we themed the entire concourse and then with other partners provided a number of activations which got customers in the mood for the show before they even stepped in to the arena itself. There are so many ways to create unique memories, you just need to get a little creative.



This is a team effort from the venues to the promoter/artist and the City to support events. It's very hard for one of the entities to have this aim

without the support of partners. Of course your venue plays a pivotal role but patrons don't attend to see the venue primarily, they come because there is an event taking place. Detailed planning and delivery from the point of sale for the ticket purchase through to the smoothness of leaving the venue helps with consumer experience but I still believe the event dictates the outcome. It's important that all of the consumer touch points are developed and that the patrons can have an easy journey with the venue experience but if it's a sporting team event and you lose »

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Fans enjoying the atmosphere at Wembley

« then I can tell you from experience it's not the greatest day out is it ?



Unique memories are created at Eden Park by harnessing fresh, new content for Auckland and New Zealand and then executing it together

with our partners to a high standard. Customer service, attention to detail and exceeding expectations are standards continually reinforced within the Eden Park team and our contractors. We currently host the EID Festival and would welcome more religious and community festivals – imagine Carols in the Park, Noodle markets, The Auckland Lantern Festival, The Auckland Pride Festival and even Movies in the Park. This illustrates that Eden Park is, and needs to remain, a blank canvas to express creativity through sport, arts, music and entertainment, reiterating the stadium is for everyone and not solely for supporters of rugby and cricket.

How does the live experience expectation differ now with the changes in fan engagement and pre-event interaction?



With social media, event organisers now have to consider how the live experience will be translated to potentially millions of others who are not attending live. The ability to follow

an event via social media channels means organisers need to consider and prioritise how the event will be conveyed on the day. Public feedback from the event is now immediate from fans, so the need to get it right for organisers is paramount. The lead up to an event on social media or even via advertising is another factor in today's world that means fans already have expectations as to what the event experience will be. In this way, the tone set in the communications in the lead up to the event has to be translated.



Once upon a time the live experience used to be simply about an act on stage or a team playing on the field.

Now it is about the whole event journey from the moment a fan or patron buys a ticket to the time they arrive home after the event. More than that, fans want to be emotionally connected to the event to the extent that promoters, teams or venues can no longer afford to simply deliver a spectator experience, they have to deliver an immersive experience. While most emphasis will be during the event, for example through experiential activations, it is also done at various touch points during the customer journey. Obtaining data is key to enable further engagement with fans, but this needs to be done carefully so that it adds value to those fans.



The Singapore Sports Hub is a 35-hectare self-contained destination made for entertainment, leisure, and sports. This versatility allows for fringe activations such as 'fan zones', to boost the fan experience during major events such as the International Champions Cups, WTA Finals, and Singapore Rugby 7s. During the recently concluded Singapore 7s, children and parents were kept occupied with fringe activities, including song and dance performances, obstacle courses, and traditional favourites such as magic shows, face-painting, and more. Starting this year, the Sports Hub has also leveraged a 'festival' concept to broaden the experiential aspect of our programming. For example, during the World Cup season in the middle of this year, we will organise the Festival of Football. This programme will set the scene for the International Champions Cup (ICC), which will see the European clubs Arsenal, Atletico Madrid, and Paris St-Germain play here at the National Stadium.

The one team approach - how are countries approaching the major events?



There has certainly been somewhat of an evolution over the past few years. Gone are the days when venues would simply negotiate a venue hire deal. Nowadays there is a whole of city approach for major events with the bid

process often led by the city rather than the venue. Success of major events is often directly linked to how well the various stakeholders can act as one team. The success of three sold out Ed Sheeran shows in Dunedin, New Zealand, which sold as many tickets as the size of the population of the city, was largely down to how well the city came together to not just sell the event but sell the destination. The outcome was a city that was proud of the vibrancy they created, a huge economic boost for the city and visitors who had a great experience and who will probably want to visit again.



As a PPP (public-private partnership) project, the Singapore Sports Hub works closely with the government in utilising the venue. It plays a

key role building a sustainable and competitive advantage for Singapore's sports tourism industry. Hence, Sports Hub works with the Singapore Tourism Board and SportSG (the national sports agency) in its approach to attracting and hosting top flight entertainment and sports events. One advantage for the Sports Hub in South East Asia is that it has a dedicated team to plan, operate, maintain, and manage the venue on a daily basis. Hence, this team is able to provide a full spectrum support for promoters, including operations, marketing, and ticketing support. Cities and countries need to unite as it's so much tougher now with developing nations competing across the broad spectrum of available events.



It is critical for venues to explore the individual and mutual interests of all parties in an effort to satisfy

everyone's needs and deliver a desirable outcome for all parties by considering: Dealing with issues that are important

to both parties; Looking for creative solutions that make both parties winners; Seeking to build trust; Seeking to satisfy needs of both parties; Bringing issues of concern into the open; Exchanging information and ideas freely.



For major events, again, there is an increasing requirement for suppliers to be able to provide a turnkey service, managing all elements of temporary infrastructure delivery. At Arena we already have the capability to provide this but are growing our in-house resources even further through acquisitions.

How do live events meet the requirements of a Host City?



According to a report released earlier this year by Auckland Tourism, Events and Economic Development (ATEED) on behalf of Auckland Council, the DHL New Zealand Lions Series 2017 matches held at Eden Park attracted thousands of international visitors and generated millions of dollars of new money whilst supporting hundreds of jobs. Auckland's unprecedented growth in recent years demonstrates the city's global appeal and diverse multicultural communities. Auckland is the largest Polynesian city in the world and along with its European, Asian and other diverse ethnic communities, there is now interest in all sporting codes, as well as recreational, musical, and cultural events.



Inevitably, successful live events improve the Host City's brand and when implemented effectively the legacy of an event bringing positive city profile continues to attract tourists for years to come.



In simple terms there are typically two categories this falls into. One is the economic benefit that a host city will get from external visitation, and indeed future visitation, and the other is the social benefits for the citizens of that city, particularly as live events create a positive sense of vibrancy. Sporting events can also promote participation in exercise which also provides health benefits. One issue to be wary of, however, is ensuring the amount of live events are not overly excessive during one part of the year such that they dilute the effects of one another, whether that be through a lack of ticket sales or insufficient capacity to be able to deliver multiple events at once. In New Zealand there has been a focus to try and attract events in the shoulder seasons, sometimes through incentives, to try and create a balance of events all year round.



Live events are important to all countries as they have the multiple benefits from international tourism and currency through to creating local footfall and a feel good factor for the local population. There can be many different ways to make a "Return On Investment" (ROI) but ultimately the ROI has to make sense and that means in monetary terms as well. In Singapore we have had the opportunity to attract International and Regional events of high quality, it's these events that have to have a multi-agency appeal at government level but also meet the needs of the event owner and be attractive for patrons. ■

For the full version of this discussion please visit our website www.psam.uk.com



Arena Group Structures at the Royal Windsor Horse Show

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Brisbane: Dolphin Oval



Phased redevelopment of the Redcliffe Dolphin Stadium at Kippa-Ring to help Brisbane Bombers' NRL expansion. Multi-stage upgrade for Redcliffe Dolphins rugby league club. 4,000-seat western stand completed June 2016. More stands to follow on eastern and northern ends. Covered seating, upgraded change rooms and a recreation area for schools and junior player camps. Finance: Federal Government AUD\$4m, Moreton Bay Regional Council AUD\$3m.

Capacity 10,000

Brookvale, NSW: Brookvale Oval

Proposed new home of NRL team Manly Sea Eagles to resist urge to move to Allianz Stadium. Community consultation process. Development of land on Pittwater Road for commercial and residential. Owner: Warringah Council.

Capacity 23,000

Cairns: Rectangular Stadium

Study commissioned from Coffey Sport and Leisure. Owner: Cairns Regional Council.

Capacity 20,000

Cost AU\$66m

Canberra Stadium

Crumbling home of the ACT Brumbies and Canberra Raiders. Maintenance costs of AU\$2m per annum. Naming rights in prospect and then new under cover multi-purpose stadium in Civic for Raiders, Brumbies, soccer, concerts, conferences, netball and basketball. Expandable to 45,000 for any future World Cup bid.

Capacity 25,000-35,000

Completion 2020

Darwin: TIO Stadium

Proposal by AFLNT (Chief Executive Tony Frawley) for upgrade of TIO Stadium at Marrara Sporting Complex. Expanded main grandstand, portable stands on the scoreboard side, kitchen and dining facilities, new changerooms and resurfacing. Designs and feasibility study (AU\$50,000) completed for submission to the Federal and Northern Territory Governments

Cost AU\$80m

Fremantle Oval Precinct

Development to maximise community use and commercial exploitation for Fremantle Football Club, South Fremantle Football Club, the Western Australian Department of Sport and Recreation, and the AFL. Masterplan: Coffey Commercial Advisory, Cox Architects, WT Partnership. Commonwealth Games 2018: athletics competition and the opening and closing ceremonies. Capacity will be temporarily increased from 25,000 to 40,000. A new warm-up track will also be constructed. Owner/operator: Stadiums Queensland.

Capacity 40,000

Gold Coast City: Hockey Centre

Upgrade complete ahead of the Gold Coast 2018 Commonwealth Games. Realignment of the synthetic pitches to meet international competition, upgrade and expansion of the clubhouse. Jobs: 50. Architect: MODE Design. Audit Quantity Surveyor: Aqenta Consulting. Construction: Alder Constructions.

Cost AU\$14.5m

Capacity 5,000 (200 legacy)

Completion 2017

Gosford: Central Coast Stadium

Australian Hyundai A-League team the Central Coast Mariners have revealed plans for upgrades to their Central Coast Stadium. The main components of a stage one upgrade to include: dual big screens in the south east and north west corners of the venue; weather/sun protection over the northern grandstand; yellow seats; additional changing rooms; wi-fi compatibility; state of the art sound system; upgrade of the corporate facilities (including a 100-seat function room); retail and café precinct.

Parramatta: Western Sydney Stadium

Work has begun on the new stadium. Lendlease has been named as preferred design and construct contractor to deliver the new venue, on behalf of Infrastructure NSW. The stadium redevelopment project, designed by Populous, will bring Western Sydney a brand new rectangular stadium with all 30,000 seats under roof cover, plus an additional 1,000 person standing area. The new stadium will be able to support a number of different sports. Work to demolish the existing stadium will begin early this year and it is expected to be open to fans in 2019. Possible demolition of Parramatta swimming centre for a stadium forecourt with retail. Better sightlines. VIP and media, 4 x dressing rooms. Incorporation of safe standing zone (1,000) that can be switched to seating. Tenants: Western Sydney Wanderers and Parramatta Eels. Parking: 1,000. Owner: Parramatta City Council. Consultant: PricewaterhouseCoopers.

Capacity 30,000-32,000 (expandable to 35,000)

Cost AU\$300m

Completion March 2019

Melbourne: MCG Sports Link

The Melbourne Cricket Club (MCC) and the Melbourne Cricket Ground (MCG) Trust have presented a billion-dollar plan to the Victorian Government that proposes a link between the MCG and the Melbourne and Olympic Parks. Elevated pedestrian podiums stretching from the MCG to Richmond Station and a new hotel and health club, with later development to include decking of the railway tracks between the MCG and the Melbourne and Olympic Parks decked, with open space created for events in the middle. To complement the expected redevelopment of the Great Southern Stand.

Richmond: Tigers Stadium

Proposal by Richmond Tigers AFL (CEO Brendon Gale) for new stadium at the club's Punt Road Oval headquarters. Team plays at MCG but could use a lower-capacity, low-cost stadium to make smaller fixtures more viable.

Capacity 40,000

Rockhampton, Queensland: NRL Stadium

Central Queensland Stadium committee set up to consider sites and manage licensing and approvals stages. Project is dependent on the success of the region in getting its own NRL team. Stadium and 1,000-seat convention centre. Jobs: 425 (operational). Developer: Capricorn Enterprises (CEO Mary Carroll). Architect: Populous. Finance: State Government.

Capacity 20,000

Cost AU\$130-150m

Sydney: Allianz Stadium

Naming rights deal is helping fund upgrade to Sydney Football Ground. Proposed level-one deck to connect to the eastern and western stands, forming a continuous upper bowl to provide extra seats at the goal ends. Developer: Sydney and Cricket and Sportsground Trust.

Capacity 60,000 (55,000)

Sydney: Blacktown Olympic Park (BOP)

Proposed upgrade to host a new AFL franchise in western Sydney. 170 metre by 150 metre main oval with a second practice field and ancillary facilities.

Capacity 10,000 (current)

Sydney: ANZ Stadium

Masterplan for upgrade of former Olympic Stadium, now back in NSW Government ownership. Operator: STADIUM Australia Operations Pty Ltd (ANZ Stadium Managing Director Daryl Kerry). Contractor: Laing O'Rourke. Architect: BVN Donovan Hill. Engineer: Arup. Vision includes a retractable roof, reconfiguration of the Stadium's lower seating bowl to improve spectator viewing and playing field dimensions – bringing spectators as close as five metres to the field of play at the northern and southern ends of the Stadium through the installation of moveable grandstands and creating a perfect rectangle for rugby league, rugby union and football; increasing the eastern and western boundaries to provide longer straight-hit boundaries in cricket and a more traditional oval shape for AFL. New and refurbished player and spectator facilities including restaurants, bars, terraces and eateries. Development of the precinct outside the Stadium, which is expected to include new precinct bars, cafes and restaurants for Stadium patrons to enjoy before and after events.

Capacity 80,000

Cost AU\$350m

Completion 2018

Sydney: Liverpool Multipurpose Stadium

Mayor Ned Mannoun's proposal for a new covered roof stadium. Retractable pitch to provide a convention and event centre floor. Possible home for Wests Tigers NRL team. Part of an entertainment and cultural precinct at Woodward Park, 800 metres from Liverpool train station and a kilometre from the M5. Finance: AUD\$400m developer contributions, AUD\$200m from the NSW Government.

Capacity 30,000

Cost AU\$600m

Sydney: Moore Park Stadium

Proposed new stadium at Moore Park for Sydney FC, currently playing at Allianz Stadium.

Capacity 55,000

Townsville, North Queensland Stadium

Four contenders as principal consultants – Populous, BVN, Cox and Hassell. Winner will be appointed by end of 2016. Contractor tender early 2017. The 25,000-seat stadium will become the new home of the NRL's North Queensland Cowboys. The Queensland government is conducting a two-stage EOI and design tender process for the proposed stadium. Townsville contributing land. Project delivery: Department of State Development. Finance: Queensland AU\$140m, federal AU\$100m, NRL AU\$10m.

Capacity 25,000

Cost AU\$250m

Completion 2020

CAMBODIA

Phnom Penh: Morodok Techno National Stadium

Centrepiece of the 2023 Cambodia SEA Games, in multi-purpose sports complex on the outskirts of Phnom Penh in Prek Phnov. Complex also houses Olympic swimming pool, outdoor football pitch, running track, tennis courts and dormitories for athletes. Finance: \$100m donation from the Chinese government.

Capacity 60,000

Cost \$100m

Completion 2021

CHINA

Hebei Province: CFFC Training Centre

China Super League side Hebei China Fortune Football Club (CFFC), has announced plans for a new Populous-designed professional training centre. To be located in Gu'an County of Hebei Province, approximately 50 km south of Beijing, the training base will include 12 FIFA standard football fields, a training hub, medical centre, hotel and apartment, gym and all the support facilities.

Completion 2018

Hong Kong: Kai Tak Sports Park

Proposed stadium at heart of 24 hectare sports hub as part of redevelopment of airport site. Companies interested in supplying goods and services to project can now register their interest on the project website. Three prequalified tenderers were invited by the Home Affairs Bureau on December 29, 2017 to make tender submissions for the contract for the design, construction and operation. The three consortia include an Alibaba Group subsidiary, New World Development and Dragages Hong Kong, a subsidiary of France's Bouygues Construction. The current Design, Build and Operate scheme includes a 50,000-seat, retractable roofed stadium, a public sports ground with seats for at least 5,000 and an indoor arena with 10,000 seats. Government seeking HK\$32 billion (US \$4.1 billion) from the legislature to help build the huge sports park. Developer: Home Affairs Bureau. Finance: public.

Capacity 50,000

Cost HK\$32bn

Completion 2022

Hubei Province: Yichang Sports Centre

Main stadium and other facilities.

Capacity 40,000

Jiangsu Province: Yancheng Stadium



Main stadium and other sports facilities in Sports Centre configuration. Outdoor tennis (1,000) and swimming (1,500) and indoor arena. Area (site): 218,298m².

Capacity 34,000

Shaanxi Province: Xianyang Sports Centre

Outdoor stadium Area: 68,695m².

Capacity 40,000

Suzhou: Multi-purpose stadium

Main stadium, one of five facilities on a single campus – stadium, sports and entertainment arena, an international-standard swimming complex, an athletics track and training centre. Plus retail mall and hotel. Curved roofs of the stadiums give the impression of pavilions in flowing landscape. Stadium roof: single-skin cable network. Well connected to the Metro. Owner: City and District authorities. Developer: Suzhou Industrial Park Sports Industry Development. Architect: von Gerkan, Marg and Partners gmp. Area above ground: 263,310m². Area below ground: 157,730m². Building services, energy planning and LEED green building consultancy services: Mott MacDonald.

Capacity 45,000

Completion 2017

Zhejiang Province: Hangzhou Stadium

Main 'Olympic Stadium' and separate tennis centre (+12,000). Adjoining Hangzhou Olympic Sports Expo Centre will be a large urban complex which is expected to boost economic activity in the areas of commerce, travel, accommodation, entertainment, food, leisure, vacation, shopping and other services.

Capacity 80,000 (stadium), 12,000 (tennis)

Zhejiang Province: Ningbo Sports Centre

Main stadium, arena and swimming hall. Area: 598,000m².

Capacity 46,000

GOA

Panaji: Campai Football Stadium

With the original stadium already demolished, the State Government has promised a FIFA-compliant soccer stadium in the next 18 months. The project is being developed in consultation with Collage Design, the infrastructure consultants for the 2017 Under-17 World Cup in India.

Capacity 4,000

Cost Rs 45 crores

Completion 2018

Thivim Cricket Stadium

For international matches and Indian Premier League (IPL) matches. Area: 100,000m². Owner: Goa Cricket Association (president Chetan Desai). Needs government approval.

Capacity 35,000

INDIA

Dwarka Cricket Stadium

International cricket stadium to become HQ of Delhi and District Cricket Association (DDCA). DDCA talking to ministry of urban development over the process of identifying and acquiring 10 acres required. To replace The Kotla (38,167).

Capacity 50,000

Cost Rs 150 crore

Completion 2020

Gujarat, Ahmedabad Cricket Stadium

Building work has begun on the new Ahmedabad Stadium, which will become the biggest cricket stadium in the world. The new Populous-designed stadium, which is being built on the site of the Sardar Patel Gujarat Stadium, will be able to hold 110,000 spectators. The new complex is expected to take about two years to build and facilities include three practice grounds and an indoor cricket academy. The stadium will have 76 corporate boxes, four dressing rooms, a clubhouse and an Olympic-size swimming pool. Once completed, it is also expected to be the home of Indian Premier League side, the Gujarat Lions..

Cost US\$84m

Hindustan, Solan, Chail: Cricket stadium

Preparing detailed project report for construction of a cricket stadium (international standards).

Jammu and Kashmir Cricket Stadium

International standard cricket stadium on land donated by government to Kashmir Cricket Association (JKCA). Finance: Board of Control for Cricket in India (BCCI).

Kerala: Stadium programme

Multi-purpose indoor stadium in each of the 14 Districts of the State. Finance: Kerala Government plus renovations and upgrades to existing facilities. Announced as part of the first budget, using money from the Special Infrastructure Fund. Stadium names will be dedicated to sports personalities who have done Kerala proud: Thiruvananthapuram (Thomas Sebastian, football), Kollam (Olympian Suresh Babu, athletics), Pathanamthitta (Blessen Goerge, volleyball), Alappuzha (K. Udayakumar, volleyball), Kottayam (Susan Mable Thomas, athletics), Ernakulam (Olympian O. Chandrasekharan, football), Idukki (K.P. Thomas, athletic coach), Thrissur (I.M. Vijayan, football), Palakkad (K.K. Premachandran, athletics), Malappuram (P. Moideen Kutty, football), Kozhikode (Olympian T. Abdul Rehman, football), Wayanad (C.K. Omkaranathan), Kannur (Jimmy George, volleyball), Kasaragod (M.R.C. Krishnan, football). Sports Department also planning a mini stadium in each of the panchayats in the State (Rs. 5 crore each). Renovations of the Jawahar stadium in Kannur and the construction of a new stadium in Adoor (Rs. 10 crore each). Upgrading of sports schools (Rs. 30 crore each to two schools), volleyball academy in Alappuzha named after Kalavoor Gopinath (Rs. 50 lakh) at the new indoor stadium named after K. Udayakumar. Finance: Kerala State Sports Council and Directorate of Sports and Youth Affairs. Budgeting has begun for the Asian Beach Games in the State during 2018.

Cost Rs 500 crore (US\$74m)

Lucknow: Ekana International Cricket Stadium

Newly opened international cricket stadium and cricket academy project developed on a public-private-partnership model. Residential and commercial as main part of development. Owner: Lucknow Development Authority (LDA). Consultants: Innovest Advisory Services Pvt, Uttarakhand Infrastructure Development Company and Infrastructure Development Finance Company Ltd. Area: 60 acres.

Cost Rs 400 crore

Completion Q1 2017

Mussoorie: Multipurpose Stadium

Stadium in hill town at altitude of 1,800 metres. Ahead of 38th National Games (2018). Outdoor stadium for hockey, football and 400-metre athletic track, indoor hall for four badminton courts and table-tennis. Basketball and volleyball courts inside the stadium. Area: 3.6 hectares. Construction: Uttarakhand Peyjal Nigam.

Punjab: Shahbaz Park & Sports Stadium

Main stadium and community sports facilities.

INDONESIA

Borneo: Balikpapan Stadium

New home base of Balikpapan's football team Persiba, which plays in Super League Indonesia.

Capacity 40,000

Completion 2017

Gelora Bung Karno National Stadium

Renovation ahead of 2018 Asian Games. Improved spectator facilities, individual seating.

Cost Rupiah 500bn (US\$40m)

Completion July 2017

Jakarta Velodrome

For the 2018 Asian Games, to cycling federation standards and in legacy converted to multi-use. Stakeholder workshops have already kicked off the design process. A modular structure will be used and readily available materials chosen. Roof: membrane. Contractor: ES Global, leading the Design & Build team – Cox Architecture, engineering Mott MacDonald, construction Wika and local architects BKM.

Capacity 3,000

Cost US\$40m

Completion June 2018

Jakarta Velodrome





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JAPAN

Tokyo: Kasumigaoka National Stadium



Building work now underway on an oval, wood-lattice framework design chosen in new international competition to achieve a more affordable project. Lumber from earthquake hit area. Tiered levels with plants and trees on concourses. Japanese-style interiors. Architect: Kengo Kuma. Construction: Taisei Corporation, Azusa Corporation. The first competition was won by Zaha Hadid Architects, but was ruled out in July 2015. In 2014 around 40,000 Japanese sports fans made the pilgrimage to bid a fond Sayonara to the national stadium. Demolition of the stadium started in July 2014 and completed in May 2015. Construction start delayed by one year. It will not now be used for the 2019 Rugby World Cup, but will host the Opening and Closing Ceremonies, athletics, football and rugby competitions for the 2020 Olympic and Paralympic Games. Debate continues over design and capacity. Ambition to incorporate green technologies. Owner: Japan Sports Council. Area: 290,000m². Architect: Kengo Kuma. General constructor: Taisei Corporation and Azusa Corp.

Capacity 68,000 (expandable to 80,000)

Cost ¥149bn (£932m) (US\$1.3bn)

Completion November 2019

Ariake Tennis Park

Some permanent, some temporary stadiums. Legacy: temporary parts will be re-used for community and schools sport. Capacity main stadium 10,000, stadium² 5,000, stadium3 3,000 (legacy 1,000), stadium4 2,500 (legacy 0).

Capacity 20,500, legacy 3,500 (total)

Cost US\$66.754m

Dream Island Archery Field

Tokyo 2020: archery. Legacy: integrated into the parkland surroundings, to host national and international archery competition events. Owner: Tokyo Metropolitan Government.

Capacity 7,000

Cost US\$15.84m

Kamaishi: Kamaishi Rugby Stadium

The only newly built stadium for the Japan Rugby World Cup 2019 will open in August in the 2011 tsunami and earthquake devastated city of Kamaishi. The Kamaishi Recovery Memorial Stadium in Iwate Prefecture will be opened on 19 August. Built on the former site of the local Elementary and Junior High Schools, construction of the stadium began in April 2017. The Kamaishi Recovery Memorial Stadium will be the only newly built facility of the 12 Rugby World Cup venues. Upon completion, it will have a permanent capacity for 6,000 spectators, with 10,000 additional temporary seats to be added for Rugby World Cup 2019, bringing the total capacity of the stadium to 16,000 for the two Rugby World Cup fixtures it will host.

Completion 2018

Musashino Forest Sport Centre

Under construction in the Tama district of Western Tokyo. Tokyo 2020: modern pentathlon. Owner: Tokyo Metropolitan Government. Legacy: sports, concerts and other cultural events.

Capacity 8,000, legacy 6,600

Cost US\$282.857m

Completion 2016

Sea Forest Waterway

Tokyo 2020: rowing and canoe-kayak (sprint). Legacy: rowing and canoe competition plus leisure. Construction of additional permanent structures required.

Capacity 24,000 (10,000 seated), legacy 2,000

Cost US\$78.069m

Seaside Park Hockey Stadium



Newly built in Ohi Seaside Park. Tokyo 2020: hockey.

Legacy: remodelled as a hockey stadium with 4,000 capacity. Owner: Tokyo Metropolitan Government

Capacity 10,000 (legacy 4,000); stadium 25,000

Cost US\$28.286m

KOREA

Changwon City: NC Dinos Baseball Park



Roof top gardens stretching the length of the building. 360 open views to the field and circulation around the whole stadium. fixed seating, grass berms and timber terraces. Restaurants, fan retail shop, function room and café have been designed for use outside game day. Design and build: Populous and Haeahn Consortium.

Capacity 22,000

Cost US\$100m

Completion 2018

Seoul Ballpark

New baseball stadium next to the Han River and sport facilities built for the 1988 Summer Olympic Games. Part of the city's urban development plan in Jamsil, southeastern Seoul. Current stadium will be demolished to make way for exhibition and convention facilities covering 100,000m². Olympic swimming pool and gymnasium will also be renovated into an indoor sports complex. Home for the LG Twins and Doosan Bears. To begin in 2021. Developer: Seoul Metropolitan Government.

Capacity 35,000

Cost Won 2-3tn

Completion 2023

MALAYSIA

Kuala Lumpur: Sports City

Government refurbishment of Bukit Jalil National Sports Complex into Kuala Lumpur Sports City. Project 1 readies Bukit Jalil National Stadium to host the 2017 Southeast Asia (SEA) Games, will carry out targeted works on Putra Stadium, National Aquatic Centre and National Hockey Stadium, improve integration with current and existing public transport links, and enhance pedestrian access across the site. Project 2 (early 2018) will create KL Sports City, a fully-integrated sports hub with high performance sports training facilities, a sports rehabilitation science centre, a youth park, public sports facilities, a sports museum, youth hostel, convention centre, and a sports-focused retail mall. Project designer: Populous. Design and build: Rukun Juang Sdn Bhd (RJSB).

Capacity 80,000

Cost US\$237m

Completion 2020

Johor: Sultan Ibrahim Larkin Stadium

Johor Darul Ta'zim's (JDT) new stadium (club owner Tunku Ismail Ibrahim). Part of JDT Sports City project. Construction: Forest City. Area: 35 acres. Finance: private, including investment from Valencia CF.

Capacity 45,000

Cost S\$180 (US\$127m)

Completion 2019

NEW ZEALAND

Auckland: Waterfront Stadium

Proposals for a new sports stadium on the waterfront in downtown for Vodafone New Zealand Warriors (Chairman Bill Wavish), the Blues and soccer. City supportive but could be as much as a decade off. To replace Mount Smart Stadium. Club looking for government financial support to add to possible private funding of NZ\$100m. Regional Facilities Auckland (RFA) Chief Executive, Chris Brooks, investigating.

Dunedin: University Oval

Proposed enlargement of the playing area of the Dunedin ground for Otago Cricket (Chief Executive Ross Dykes) and to make it a test venue. Owner: Dunedin City Council.

Capacity 6,500 (3,500)

Tauranga Stadium

Proposed purpose-built stadium at The Domain as part of civic heart project. Proposed by group of property developers. City to consider all submissions.

PAKISTAN

Islamabad: Benazir Bhutto Stadium

Cricket Stadium delayed over environmental concerns as the land is in the National Park Area at Shakarparian. Land lease: CDA (30% of stadium income). Developer/operator: Pakistan Cricket Board. Area: 35 acres. Area: 35 acres.

Capacity 50,000

Karachi: Bahria Town Cricket Stadium

Pakistan's largest cricket stadium at the Bahria Sports City. Plus football ground, golf course, and a five-star hotel. Architect: GMP Architects. Owner: Bahria Town..

Peshawar Soccer Stadium

Proposed stadium with central government support.

Cost Rs30m

PAPUA NEW GUINEA

Port Moresby: Sir Hubert Murray Stadium

Private public partnership. Construction: Curtain Brothers. Government seeking sponsorship from BSP to finish main grandstand. New trustees will be appointed for ongoing operation. Will host games in Rugby League World Cup 2017. Minister for Sports and National Events: Justin Tkatchenko.

Capacity 20,000

PHILIPPINES

Manila Football Stadium

Home for national soccer team. Location to be decided. Owner: Philippine Sports Commission (PSC). Funding: annual operating costs FIFA.

Capacity 75,000

Cost P300m

TAIWAN

Tainan Ballpark

City government planning to build an international standard baseball stadium in the city's coastal Annan District, featuring administrative and TV broadcasting facilities. Open international design contest for the baseball stadium and training complex. Second stadium and two little league arenas. Site area: 30-hectares. Gym, training pitches, dressing areas and public spaces. Project Sponsor: Department of Sports, Tainan City Government. Project Organiser: Bureau of Public Works, Tainan City Government. Co-organizer: Taiwan Engineering Consultants Group / Transcend Engineering Consultants.

Capacity 25,000

SOLOMON ISLANDS

Honiara: National Stadium

To host 17th Pacific Games in 2023.

Completion 2021

TONGA

Nuku'alofa: National Stadium

Upgrade ahead of the 2019 Pacific Games. New Zealand-funded feasibility study and design.

Capacity 5,000

Cost \$NZ2m

EMEA

ALBANIA

Tirana: National Soccer Stadium

To ensure hosting of UEFA competitions. On site of 70-year-old Qemal Stafa Stadium. Demolition of old stadium under way. Underground parking, hotel, shops and bars. Developer: Albanian soccer federation. Construction: Albstar.

Capacity	22,300
Cost	€50m
Completion	2019

ALGERIA

Algiers: Baraki Stadium

Soccer stadium, including practice facilities. VIP hospitality areas, conference rooms and offices. Secondary stadium, training fields, indoor halls, tennis courts, along with residential/educational and commercial facilities. Architect: Atelier Tom Sheehan & Partners (ATSP). Developer: Wilaya. Manager: DJSL. Engineers: GLI, DVD, Designer: ABDI, QS: AD economist. Contractors: CRCEG (China).

Capacity	40,000
Cost	€100m (overall €210m)
Completion	2018

AUSTRIA

Vienna: Generali Arena



Upgrade for Austria Wien's soccer stadium. VIP lounges: 38. Temporary move to Ernst Happel Stadion. The north stand will hold 4,100 spectators and include 28 VIP boxes, two sky boxes and two boxes for dignitaries. It will have an underground car park for 370 VIPs. The east stand will hold 5,050 spectators and house the fan shop, museum and a restaurant. The west stand will seat 5,600 spectators, while the south stand will take 2,750 spectators and will also be host to two TV studios, the press area, as well as the team dressing areas. It will include 10 VIP boxes.

Capacity	17,500
Cost	€42m
Completion	Q3 2018

AZERBAIJAN

Dalga: National Team Stadium

Base for national team, financed by AFFA.

Capacity	6,000
FC Gabala Stadium	
Stadium, training base (5 natural, 1 synthetic pitches) and Academy of Football Administration (education). Area: 7 hectares.	
Capacity	15,000

BAHRAIN

Sakhir: Football Stadium

International standard stadium with football pitch, an underground shopping complex and a cinema in Southern Governorate. To include an Olympic-size swimming pool, sports training schools and halls dedicated to various sports such as basketball, handball, bowling, badminton and table tennis. Also to help Bahrain enter the race to host the Asian Cup championships. Developer: Southern Municipal Council (council chairman Ahmed Al Ansari).

Capacity	50,000
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BELARUS

Minsk: Dinamo Stadium

Reworking as large track-and-field complex to obtain category 1 IAAF certification. Olympic elements retained. Auxiliary stadium with warm-up ground, a sector for hammer, javelin and discus throwing along with dressing rooms and climbing wall. Perimeter will be covered with structures made of light materials. Turf: natural. New lighting, press centre, a physical culture complex, a medical centre, dressing rooms and halls for boxing, weightlifting and sports games. Catering facilities such as retail outlets, bars, cafes and restaurants as well as parking lots, including for buses, will be constructed. Backs bid to host the 2019 European Olympic Youth Festival. Design: Minskproject. Developer: Tourism Department of the Minsk City Hall.

BELGIUM

Antwerp: Royal Antwerp Bosuilstadion

Royal Antwerp FC plans to build a new western grandstand at its Bosuilstadion after winning promotion back to the top division of Belgian football. The new building will include changing rooms for players, referees and staff, a high-end media centre for the press, facilities for emergency services, catering, loges and VIP rooms.

Capacity	12,975
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Bruges: Club Brugge Stadium

Proposed new stadium and training centre in the north of Bruges for Club Brugge soccer team.

Capacity	40,000
Cost	€100m

Leuven: Stadion Den Dreef

New two-tier east stand. Player facilities, club offices (250m²), media zone and two cafeterias. Corporate boxes: 10. Finance: €4m public loan, €500,000 grant, rest commercial.

Capacity	3,500
Cost	€5m

Liege: Stade Maurice Dufasne

Corner filling to add 7,000 capacity at the home of Standard Liège. Possible car park.

Capacity	+7,000
Completion	2018

Ostend: KV Oostende Stadium

New stand with three floors in red-green wooden façade. Business seats: 1,250. Architect: Zwarts en Jansma and ABV+ Architecten.

Capacity	8,000 (+3,700)
Cost	€12m

BULGARIA

Plovdiv: Botev Plovdiv FC Stadium

Work on Botev Plovdiv's renovated soccer stadium (Hristo Botev) halted after financial issues surrounding problems with Corporate Commercial Bank AD (owner Tsvetan Vasilev). Restarted. Concession owner: Botev Plovdiv (35 years). Architect: Georgi Savov.

Capacity	18,777
Cost	€10m
Completion	2017

Sofia: National Stadium

Long-term commitment confirmed by Bulgarian Sports Minister Mariana Georgieva. Possible host of Euro 2020 games. Bulgarian Football Union, Bulgarian club Slavia and German investment company IFS have signed a preliminary agreement. On the site of Slavia's stadium. Volleyball and basketball facilities. Replaces Vasil Levski national stadium which will now be used for athletics only.

Capacity	40,000
Cost	€40m

CROATIA

Croatia: Kantrida Stadium

New-build stadium for HNK Rijeka on same site. It will have about 14,000 covered seats and will meet the standards of UEFA category 4. The stadium will have approximately 3,000 seats for VIP visitors and sponsors, around 1,000 family seats and some 4,000 seats for the most loyal supporters.

Capacity	14,000
Completion	2020

EIRE/REPUBLIC OF IRELAND

Bohemians Stadium

Stadium for Bohemians after sale of Dalymount Park. Developer: Andorey Developments.

Capacity	10,000
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Bryanstown: Drogheda Stadium

Proposed for Drogheda United (Vincent Hoey). Uncertainty over land allocation and rival alternatives.

Capacity	10,000
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Dublin: RDS Arena

Planning application granted for redevelopment of three-storey Anglesea Stand as first phase of ground development (capacity to 21,000). Two-storey building attached via glazed bridge. International design competition won by Dublin-based Newenham Mulligan Architects and London-based Grimshaw Architects. Five designs anonymously shortlisted, with the winner chosen by a five-person expert jury. RDS, with Leinster Rugby, will work to complete the design that will host professional rugby matches, equestrian sports, music concerts and other sporting opportunities. Six-month time frame until choice of concept architect. Client: RDS (Chief Executive Michael Duffy). Tenants: Leinster Rugby (Chief Executive Mick Dawson), RDS Dublin Horse Show. Finance: applying for government grant, seeking naming rights deal.

Capacity	25,000 (18,500)
Cost	€35m (Anglesea Stand €21m)
Completion	2019

Dublin: St Patrick's Athletic

League of Ireland Premier Division team St Patrick's Athletic FC has revealed plans to build a new stadium in Dublin. In association with HRS International and FESP International, St Patrick's announced a proposal for a major development at St Michael's Estate in Inchicore, to include new homes and an Inchicore Town Centre with state-of-the-art retail, leisure and community facilities on top of which would sit the club's new stadium. The stadium has been designed by a leading European architect, David Mizrahi of HRS International.

Capacity	12,000
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Limerick FC

Medium-term plan to build new stadium for Eircom League team playing at Hogan Park.

Capacity	7,000
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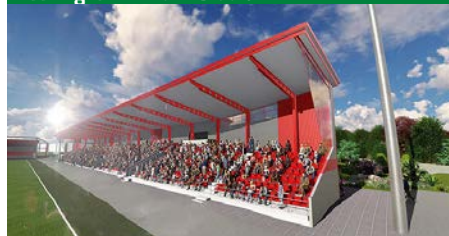
Tallaght Stadium

Plan for third stand for home of Shamrock Rovers. UEFA category 4 capable of hosting Champions League group and play-off games. Owner: South Dublin County Council. Funding: public.

Capacity	8,000 (+2,150)
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ENGLAND

Accrington: Wham Stadium



Redevelopment of the Accrington Stanley (owner Andy Holt) stadium. Terms agreed with Hyndburn Council on a 50-year lease. First phase: new 1,500-capacity all-seater single-tier stand down the Whinney Hill side of the ground. Ability to split to accommodate home and away supporters. Expandable to add corporate entertainment boxes and facilities. Architect: Frank Whittle Partnership.

Capacity	5,000
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Aldershot: Aldershot Town FC

Aldershot Town Football Club has presented Rushmoor Borough Council with its proposals for the redevelopment of the entire EBB Stadium. The stadium has been the club's home since it was originally reformed in 1926. This would see the potential development of a new stadium, containing both seating and standing areas, that will give the Club a long-term home from which to build its ambitions on the pitch.

Barnet: The Hive

Barnet FC have announced plans for a major overhaul of The Hive that would increase the stadium's capacity to approximately 8,000. Architects proposals will involve replacing the current South terracing with a new all-seater stand as well as a revamp and extension of the East Stand. Also a new-look indoor Academy centre with indoor pitches behind the South Stand. A new multi-purpose indoor sports hall will also be built at the back of the North Stand, with facilities for other sports such as basketball, netball and badminton. Behind the North Stand sports hall will be a new 11-a-side 3G AstroTurf pitch alongside eight smaller ones – open to the wider community as well as the Bees' Academy teams. Subject to planning approval from Harrow Council, the club anticipate that work on the site will begin at the end of the 2017-18 season.

Capacity 8,000

Barrow: Furness Building Society Stadium

Five-year plan from owner Mark Casson to redevelop the Barrow AFC's stadium, including new stands on the Popular Side (currently a terrace), the Main Stand (seats and standing) and the Steelworks/Crossbar End (standing) sections of the ground. New fan, corporate and hospitality facilities will also be installed and the previously planned ground improvements, including the floodlights and Crossbar building, will be completed.

Cost £10m

Completion 2018

Birmingham: Alexander Stadium



Plans have been revealed for a major revamp of Birmingham's Alexander Stadium to get it up to standard for the 2022 Commonwealth Games. The capacity of the stadium will be increased from 12,700 to 40,000 and 20,000 seats will be retained after the event.

Prime Minister Theresa May confirmed the expansion of the stadium, which will host the 2022 opening and closing ceremonies as well as athletics, when she visited Birmingham on Wednesday. She said the investment would be transformational and benefit the local community and the West Midlands region.

Cost £75m

Boston: Boston United Stadium

Community stadium for Pilgrims as part of The Quadrant. Developer: Chestnut Homes. Architect: WMA Architects and Planners. Planning permission granted. All-weather 3G pitch, educational facilities, conference and banqueting facilities; a café; education and community facilities; meeting rooms for hire; sports hall attached to stadium. Specifications to Football League standards.

Capacity 5,000

Completion 2018

Bournemouth: AFC Bournemouth Stadium

AFC Bournemouth has identified a site on which to build its new stadium at Kings Park in the seaside town. With support from Bournemouth Council, the club has been looking at potential sites for a new stadium and has identified an area of land which includes the park's athletics stadium and the club's existing training pitches. A planning application for the new stadium is expected to be submitted next year. As part of the planning process an additional feasibility study will also be carried out into the potential relocation of the athletics stadium which is currently in Kings Park. It is not the intention to utilise the current Vitality Stadium as the site for any relocated athletics track.

Completion 2020

Bristol: UWE Stadium



Bristol Rovers FC have abandoned plans to build a stadium on land leased from the University of the West of England at its Frenchay campus. Parties were unable to agree acceptable terms. Council permission had been received. Project included supporters' club bar, shop, banqueting and hospitality suite, convenience store, crèche, gym, jogging track, teaching area (19,000ft²). Facilities available to university on non-matchdays. Possible share with Bristol RUFC. Parking: 1,270. Bristol Rovers sold in 2016 to the Jordanian Al-Qadi family. The club's new President, Wael Al-Qadi, has confirmed a new stadium is a "key requirement" for the new owners. Funding: private.

Capacity 21,700

Cost £40m

Cambridge Abbey Stadium

With the proposed community stadium for Cambridge United, Cambridge City and Cambridge Rugby Club blocked, the Club will now redevelop their existing Abbey Stadium. Stadium owner Grosvenor released their first sketches of potential designs for the redeveloped stadium in May 2015, with plans to change the name to the Cambridge Community Stadium. At present, the main plans are to increase the capacity in the Newmarket Road End to 3,500 and to introduce safe standing. The new design will include community facilities for public use. The Habbin Terrace will also be completely redeveloped, which will see it become fully seated and expanded as well. The main stand will also be expanded slightly and redeveloped. Feasibility study: Cambridgeshire Horizons.

Capacity 8,000

Cambridge City FC Stadium

Planning permission granted but now under judicial review. Club owns 35 acres of land and has done some preliminary work.

Capacity 3,000

Castleford Tigers Stadium

Stadium for Rugby Super League Club Castleford Tigers (CE Steve Gill) as part of £135m Five Towns Park regeneration project in former coalfields area in West Yorkshire. Adjacent to Junction 32 of the M62. Replaces Wheldon Road ground, which opened in 1926. Designed to meet Super League requirements, the purpose-built stadium will provide administration, changing facilities, restaurants and hospitality areas, with a mixture of both seating and standing terraces. Work is expected to start early 2016, with a view to Castleford Tigers moving in by the 2018 season. Developers: Lateral Property Group (MD Philip Lunn), Wakefield MDC and the Tigers. Main contractor: GMI Construction Group plc.

Capacity 13,300

Cost £15m

Completion 2021

Edgbaston: Warwickshire County Cricket Club

Warwickshire County Cricket Club has announced the next phase of development at Edgbaston Stadium. An £85 million project has been agreed with PATRIZIA UK and the Homes and Communities Agency to build 375 new Build to Rent homes and new retail and catering opportunities. The new development, which is subject to planning and local consents, will be built on a four-acre area of Edgbaston's site and it will also provide a new main entrance to the stadium on Edgbaston Road, a plaza area for match day spectator experience opportunities and an extension to the on-site car parking behind the RES Wyatt Stand.

Capacity 9,200

Exeter: St James Park

Exeter City Football Club has confirmed that work will start on its stadium improvement project this summer. Contracts to start the work at the St James Park Stadium have been signed and developers plan to begin construction in June. The project began with a feasibility study in 2006, which led to a planning proposal in 2011. This was aborted following a number of problems. The current scheme, with developer partner Yelverton Properties Developments Ltd, was instigated in 2014. It has overcome many setbacks and delays, including two substantial legal challenges. The provisional programme for the works is: June – November 2017: construction of the Big Bank toilets, new changing rooms and associated works. November 2017: demolition of the existing Old Grandstand followed by construction of the new stand and external works. This phase will also include the demolition and construction of the new Away End stand. The project is due to finish by October 2018. Enabling development of approximately 320 student beds. Commercial partner: Yelverton Properties.

Completion 2018

Forest Green Rovers Stadium

Zaha Hadid Architects won the competition to design stadium for Chairman Dale Vince. Competition oversight: Frank Whittle Partnership. Priority is sustainability – materials and operational. Public consultation on plans for a new stadium at Junction 13 of the M5 for English National League side. Part of a 100-acre sports and green technology centre called 'Eco Park' to include training fields, 4G pitches, multi-disciplinary sporting area, as well as a sports science hub.

Capacity 5,000 (expandable to 10,000)

Cost £100m (overall project)

Gloucester: Meadow Park Stadium

Gloucester City AFC seeking full planning approval for a new stadium at Meadow Park. Currently ground-sharing at Cheltenham Town's Whaddon Road since forced out by flooding.

Capacity 4,000

Completion 2019

Grimsby: Grimsby Town FC Stadium

Sports and leisure property developer Extreme Leisure has teamed up with Grimsby Town FC to develop a new stadium at Peaks Parkway. Having signed an agreement with the Club, Extreme is now progressing with the viability assessment with a view to obtaining pre-application planning. The facility mix being considered includes a state-of-the-art 14,000-capacity soccer stadium, a new ice rink, additional sports & leisure facilities, retail and food & beverage offers.

Capacity 14,000

Cost £55m

Harrogate: Harrogate Town FC

Harrogate Town FC has been granted planning permission for its proposed developments to the CNG Stadium.

The National League North club's application was granted approval at a meeting of Harrogate Borough Council's planning committee. Proposals include a new two-storey clubhouse, seated terraces, an office building, classrooms to be used as community facilities and a new, improved floodlighting solution. The club's recently-installed 3G playing pitch was also approved by members.

The development will increase the capacity of the ground from 2,800 spectators to around 5,000.

The club was advised on its application by Indigo Planning and the scheme was designed by Bowman Riley Architects.



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Leeds: Headingley Stadium



Leading structural engineering specialist TRP Consulting has been appointed to the team that will deliver the £40 million redevelopment of Emerald Headingley Stadium in Leeds. Funding agreed and planning granted for an increased capacity cricket stadium with modern fan facilities, athlete accommodation and improved integration with the surrounding neighbourhood. For the rugby stadium, the proposals will provide a replacement North and South Stand with enhanced facilities for players, fans and visitors. The new South Stand will also replace some of the Rugby capacity lost by the development of the joint Stand between rugby and cricket, and for the first time will include an element of seating within the stand. Standing capacity will still exceed the current level of members in the South Stand. Finance: public and private (Yorkshire County Cricket Club and Leeds Rhinos – CD Chief Executive, Gary Hetherington). Finance: Leeds City Council grant: £4m. Yorkshire County Cricket Club's 20-year masterplan phase one: erection of four permanent floodlight pylons; phase two: rebuild the North/South Stand in conjunction with Leeds Rugby to incorporate a three-tiered seating area to accommodate 5,060 seats, enhance corporate facilities and new permanent concession units; phase three: incorporates an additional 915 seats in the upper tier of the North East Stand; phase four: development of a new pavilion in the North West area of the stadium, which will be built on five levels and is to include state-of-the-art corporate facilities, new dressing rooms, a Members' Long Room, plus the creation of a main entrance to the stadium on Kirkstall Lane; phase five: The erection of a translucent cantilever roof to cover the White Rose Stand on the western side of the ground. Phase Six: Landscaping on the White Rose Stand and North East stand concourses.

Cost £40m

Capacity 20,000

Herne Hill: Velodrome Pavilion

Planning permission for the pavilion was granted by Southwark Council in June 2015. Construction is expected to begin this spring with completion due late in the year. Area: 275m². Owner: Herne Hill Velodrome Trust. Architect: Hopkins Architects.

Cost £1.75m

Completion Spring 2017

Leamington: Leamington FC Stadium

Leamington FC looks set to push ahead with the development of a new 5,000 capacity stadium after a deal to buy land for the project was agreed. Warwick District Council has approved the purchase of land off Europa Way in Leamington to allow for the development of the community football stadium. Plans call for football stadium with a 3G artificial pitch, conference facilities, a gym, bar, café and community facilities on land adjacent to Europa Way and Gallows Hill.

Capacity 5,000

Leeds: Leeds United FC training ground

Leeds United unveiled plans to build a new training complex in the city, close to their Elland Road ground. In talks with Leeds City Council. The current first team training ground is based at Thorp Arch, which is over 40 minutes away from the heart of the City. In addition, the Club does not own the training facility at Thorp Arch, making it challenging for the club to bring forward their own improvement proposals that would meet the required Category 1 status. Leeds United is looking to move its official training facilities for senior and academy players to the currently vacant former Matthew Murray High School site in south Leeds. As part of the new developments, a 'Community Sports Village' would be built at Elland Road's Fullerton Park site.

Leicester: Leicester City training Ground

Leicester City Football Club has unveiled plans for a brand new, state-of-the-art training facility. The development will be on a site in Charnwood. A programme of public consultation has been scheduled for Spring 2018, giving local residents, businesses, communities and Foxes fans the opportunity to discuss the proposals for the new site – previously occupied by Park Hill Golf Club. Future plans for the site of the club's current training facility at Belvoir Drive in Leicester are under consideration and will be decided upon in due course.

Liverpool: Everton Stadium

The architect of Everton FC's new stadium is determined to capture the magic of Goodison and build a fan-first, football-first home for generations of Evertonians. Dan Meis revealed he has fallen "in love" with Everton and said the Club's "vision" and strong identity will allow him to design a stadium at Bramley Moore Dock that will be "a model for football the world over." The club and Liverpool City Council have agreed the principles of an innovative finance model.

Capacity 50,000

Liverpool: Liverpool FC Training Ground

Liverpool FC is planning a major redevelopment of the Reds' Academy site in Kirkby. Club wants to bring first team and Academy football training operations and facilities together on one site. The £50 million proposal includes the construction of a new combined training centre, the redevelopment of the existing facilities at the Academy and designs to convert the main pitch into an indoor pitch. Public consultation being held. Architects: KSS.

London: Allianz Park

Aviva Premiership rugby club Saracens improving Allianz Park ground after winning planning permission for the scheme from Barnet Council. Replacement of ageing West Stand with a new, modern stand which would consolidate and enhance the provision of community, education and sporting facilities at the stadium. Allianz Park, as a multi-use community stadium, has become an essential hub of community, education and sporting activity in Barnet and North London.

Completion autumn 2018

London: Craven Cottage Stadium

Fulham Football Club's plans to redevelop the Riverside Stand at Craven Cottage have been approved. The Club's previous Riverside Stand design received planning permission in 2013 and this enhanced scheme also incorporates the opening of the riverside walk from Putney to Hammersmith, an aspect of the approved design and a major benefit to the local area, in addition to improved facilities for users on both match and non-match days. The new stand will increase the overall capacity of Craven Cottage and the main works are expected to commence in the Summer of 2019, with a full timeline of scheduled works announced in due course.

Architect: Populous.

Capacity 30,000 (25,000)

London: Emirates Stadium

Arsenal FC plan to increase capacity at the Emirates Stadium over the next two years. The Premier League club said the stadium's capacity has been reduced in recent seasons due to safety requirements and improvements to facilities for disabled supporters. Work will begin next May on adding approximately 780 extra seats to Club Level to help bring capacity back in line with the original figure from 2006. It will involve adding an extra row to the front of Club Level and will take the stadium's capacity to just over 60,600. Construction will be completed in two stages during the summers of 2018 and 2019. Arsenal also plans to upgrade and refurbish additional areas of Club Level over the next two years. The first upgrade will be to Dial Square in the summer of 2018, which will see the area transformed to celebrate the club's original name of Dial Square Football Club.

Completion 2019

London: Brentford Community Stadium

Ground broken on Brentford FC's new stadium. The club, which is set to share the new venue with London Irish RFC, submitted a revised planning application. Amendments included: Reducing the capacity from 20,000 to circa 17,250+; Reducing the stadium footprint to introduce a new road along the northern perimeter; Compressing the stadium 3m to the south (staying within the approved planning envelope); Converting the east and west stands to a single tier; Lowering the roof form on the east and west stands; Lowering the south stand by removing the top tier; Providing more premium seats from 1,800 to 2,930. This will strengthen an important revenue stream for the Club; Making it Premier League and Premiership Rugby compliant from day one.

Capacity 17,250

Cost £70m

Completion 2019

London: Lords Cricket Ground

Marylebone Cricket Club (MCC) has unveiled WilkinsonEyre's designs for the new Compton and Edrich stands which will form the next phase of the Lord's Masterplan. The new three-tier stands will accommodate around 11,500 members of the public at the Nursery End of the Ground. Capacity will be increased by 2,500 seats, and a walkway linking both stands and overlooking the Nursery Ground will be introduced.

From the Pavilion, MCC Members will still be able to view trees through gaps in and over the top of parts of the new stands.

The timeline of the Updated MCC Masterplan is:

2019-21: new Compton and Edrich stands with up to 2,000 extra seats built.

2021-22: new East Gate Building (first phase).

2023-25: East Gate Building (second phase), including goods entrance, car park, shop, hospitality facilities and ECB offices.

2025-26: demolition of the Nursery Pavilion and extension of the Nursery Ground playing area up to the Wellington Road. The Nursery Ground would be slightly larger than at present.

2027-30: construction of the South-Western Project, principally including the redevelopment of the Tavern and Allen Stands and Lord's Tavern.

2031-32: new facilities for groundsman and ticket office staff would be built at the North Gate.

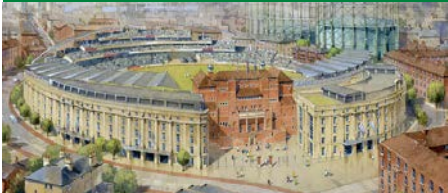
Capacity 32,000 (29,500)

Cost £180-200m

Completion 2022 (second phase) 2027 (entire)



Lords Cricket Ground

London: Oval Cricket Ground

Surrey CCC has applied for planning permission to redevelop the Lock/Laker Stand at the Kia Oval. The redevelopment would increase the capacity of the Test Match ground in Kennington, London, to 28,000. The news was announced by chairman Richard Thompson to members at Surrey CCC's AGM, during which CGI pictures of the final design were also shown for the first time. The new Lock/Laker Stand will increase the capacity of the ground to around 28,000, adding 2,500 seats. The development will see the existing Peter May Stand extended around to link to the Micky Stewart Members' Pavilion with two tiers, including further roof terracing, added above. There will also be an extension to the Micky Stewart Members' Pavilion, by adding an extra wing to the original building, built in the 1890s, which will make it fully symmetrical when viewed from the Vauxhall End of the ground and add new rooms for Members' use on match days.

Completion 2021

London: QPR Stadium

QPR are looking to develop a new stadium on the site of the Linford Christie Stadium in London after plans for development at Old Oak were thwarted. The Championship side could develop a partnership with athletics club Thames Valley Harriers which use the stadium next to Wormwood Scrubs. The venue was originally called the West London Stadium and was then named after Olympic 100m champion Linford Christie, who grew up in the area. The new potential site is located a mile from QPR's current Loftus Road home. QPR previously announced plans for a stadium at Old Oak. Common but acquiring the land from the owner proved difficult. Development partner: Stadium Capital Developments. Masterplanner: Farrells. Architects: CZWG and Populous. Project manager: EC Harris. Planning advisor: Savills. Land agent: Anthony Green & Spencer.

Capacity 40,000

London, Chelsea: Stamford Bridge

Chelsea Football Club's plans for a new 60,000 seat stadium to replace Stamford Bridge have been put on hold. The move comes as owner Roman Abramovich was denied a visa to return to the UK. He has since become an Israeli citizen. A right to light issue for neighbours had been solved. The new stadium was set to be built within the grounds of Stamford Bridge on Fulham Road, and required the demolition of the existing 41,600 seat stadium. The plans also included a new club shop, kiosks, museum and a restaurant/café. The brick-clad stadium – which won plaudits from members of the planning committee for its look – has been designed by architects Herzog & de Meuron. Consulting: Herzog & de Meuron, Lifschutz Davidson Sandilands.

Capacity 60,000

London: Crystal Palace, Selhurst Park

Crystal Palace FC will start work on an iconic new Main Stand at Selhurst Park in summer 2019 after being given the green light by planners. The project, which is expected to cost between £75-100 million, will increase the capacity at Selhurst Park from 26,000 to more than 34,000, transforming the match-day experience for supporters and providing new facilities for the community while retaining the ground's uniquely passionate Premier League atmosphere. New Main Stand capacity of 13,500, with more than 10,700 of these General Admission seats. Design pays homage to the original Crystal Palace on Sydenham Hill. Improved facilities for supporters with disabilities and a substantial increase in wheelchair spaces. A new museum, a bigger pitch, increased from 101.5m x 68m, to 105m x 68m, making Selhurst Park compliant with UEFA regulations and eligible to host tournament football. Premium hospitality and entertainment facilities for more than 2,500 supporters, including a new Tunnel Club, and between 16-28 boxes. Improved sightlines in the Arthur Wait Stand with the removal of the TV gantry, and improved concourses. Redevelopment of the upper Whitehorse Lane Boxes into mixed bar/box use.

Capacity 34,000

London: Tottenham Hotspur Stadium

Construction work ongoing. Roof currently being installed. Application to increase capacity to 62,000. Single tier end stand with 17,000 capacity will be biggest in UK soccer. Fully retractable pitch with second layer playing surface to NFL standards. Tottenham Experience, visitors centre and arrivals hub, skywalk experience, museum (incorporating Grade II listed Warrington House), cinema megastore, ticket office and cafe. Basement for parking, plant and storage. Leisure facilities, public space, supermarket and housing near current White Hart Lane site. The wide choice of premium suites, new style lounges and seats available including the first purpose-built glass-walled Tunnel Club in the UK which will allow lounge guests to see the inner sanctum with a behind-the-scenes view of the players' tunnel, while also enjoying the action from player-spec 'Recaro-style' seats, located behind the First Team technical area. Planning: Savills. Architect: Populous. Heritage architect: Donald Insall Associates. Project manager: AYH Arcadis (Paul Mitchell). Engineer: Buro Happold. Contractor (civil, engineering, structure): M Anderson Construction (£50m). Construction partner (plans, programs, tenders): Mace.

Capacity 61,000

Cost £700m

Completion 2018

London: Twickenham East Stand Extension

The London Borough of Richmond upon Thames has granted planning consent for the major new extension. The East Stand extension will see the first significant development of the stadium since the South Stand was completed in 2008 and provides over 11,600sqm of hospitality and debenture holders across six levels. Architect: KSS.

Mechanical Engineer ME Engineers

ME is providing MEP design

Completion autumn 2018

Luton: Luton Town Stadium

Luton Town FC has taken a significant step forward in its plans to build a new stadium at Power Court in the town after sealing a deal to buy the land for the scheme. The planning application for Power Court is for a new football stadium with ancillary stadium-related facilities, residential floor space, flexible educational, community and commercial uses, hotel accommodation, retail and food and drink outlets. Financially associated Newlands Park development. Planning application submitted summer 2016. Architect: AndArchitects.

Capacity 17,500 rising to 23,000

Completion 2020

Newcastle: Kingston Park

English Premiership rugby side Newcastle Falcons have been given a boost after planning permission was granted for ambitious improvements to their Kingston Park Stadium. Newcastle Rugby Ltd's plans include major development work to the North Stand which would increase the stadium's capacity from approximately 10,000 to 11,730, with additional parking and infrastructure. Significantly increasing the number of covered seats and hospitality spaces, the plans would also improve training, medical and office facilities.

The North Stand, which is currently an uncovered terrace with no bars or toilets, would be transformed into a state-of-the-art facility featuring 1,530 covered seats, standing accommodation for supporters, new fitness and medical facilities, meeting rooms and hospitality space.

Plymouth: Home Park Mayflower Stand

GL events UK has been appointed to carry out stadia redevelopment at Home Park Stadium, home of Plymouth Argyle FC. Plymouth Argyle were earlier given the green light for the development of Home Park's Mayflower grandstand. The development will provide Argyle with a refurbished grandstand; new players facilities; new offices and classroom; new bars; retail and ticketing functions; and a conference and banqueting facility. Seating capacity will be increased to around 18,600 in stage one and to more than 20,000 in stage two. The wider development includes a new international size ice-rink; a hotel; a gym; offices; and restaurants. It is expected to employ 400 additional people once completed and more during the construction phase.

Salford: Moor Lane

Redevelopment plans for new stands and terraces, with one all-seater stand running the full length of the pitch, submitted to Salford City Council shortly as Salford City FC gets ready for promotion. Also planned is a Class of '92 suite and parking for executives. Design: Zerum. Finance: private (Class of '92 and Peter Lim).

Capacity 5,108 (2,241 seats)

Scunthorpe: Iron Arena

Masterplan issued for out of town football and leisure development on a site near the Scunthorpe United's present Glanford Park ground. All-seater stadium with club and executive facilities, a gym, office space and areas for commercial development as well as a club venue and supporters' bar. A sweeping curve on the main stand designed by FWP is enhanced by a striking truss which pays homage to Scunthorpe's steelwork history. Plan also includes a 120-bed hotel, a multi-use indoor arena, community sports pitches, indoor and outdoor crown green bowling facilities and a potential transport interchange hub with a new rail station. Architect: Frank Whittle Partnership (FWP).

Capacity 12,000

Cost £25m

Sheffield: Olympic Legacy Park Stadium

On the Don Valley Stadium site. Tenant team: Sheffield Eagles RLFC (Chairman Ian Swire). Main stand (capacity 2,500) will have a 50-bed hotel, restaurant and hospitality facilities along one side of the ground, and there are plans to develop joint facilities with Sheffield's second University Technical College (UTC) within the stadium complex. Pitch: synthetic – capable of supporting Super League, Rugby Union Premiership and international level, school and UTC. Also in the Park will be an Advanced Wellbeing Research Centre (AWRC) and clinical facilities run by the National Centre for Sport and Exercise Medicine (NCSEM). The Olympic Legacy Park project leader: Richard Caborn. Executive Director for Strategic Planning and Business Development: Andrew Cropley. Sheffield Eagles Director of Community, Development and Education: Ian Annis. Finance: mixture of private and public (regional growth fund, council).

Cost £6m

Completion 2017

Southend United FC Stadium

Football stadium, 131-bed hotel and residential development, an 11-12 screen cinema, retail and restaurant floorspace, together with related ancillary infrastructure at Fossetts Farm. Two soccer domes. Developer: Martin Dawn plc (in discussion with British Land plc to forward fund the retail development, which will facilitate the first phase of the new stadium).

Capacity 21,000



Stoke: bet365 Stadium

Work is underway at Premier League Stoke City FC's bet365 Stadium to increase capacity to over 30,000. The Club is to 'fill in' the south east corner of the stadium which will add 1,800 seats to the capacity – the first major building project at the home of the Potters since it was constructed in 1997. The Club has appointed South Wales-based contractors Andrew Scott Ltd to carry out the redevelopment work which is currently planned to be completed in time for the start of the 2017/18 season. As part of the multi-million pound project, the Club is also installing two state-of-the-art LED big screens and making further provision for disabled supporters. 17,000 seats also being replaced.

Capacity 30,000

Swindon: Abbey Stadium

Speedway and greyhound stadium development to include a play area for youngsters, a racing building, training kennels and market. Jobs: 62. Parking: 479 on-site.

Torquay: Torquay United Stadium

Move from Plainmoor to Barton area. Council to sell existing stadium for housing development. Truro City sharing while building a new stadium. Pitch: synthetic 4G.

Capacity 6,000

Truro: Stadium for Cornwall

The Cornish Pirates RFC and Truro and Penwith College are joining forces with Truro City FC and the club's developer partner, to deliver the Stadium for Cornwall project together. Both clubs and the college will jointly occupy a single stadium at Langarth Farm near Truro. Trio working together to secure the £10 million required to fund the 6,000 capacity facility, which will include funding being provided by the Cornish Pirates RFC, Truro and Penwith College and Truro City Football Club. Main grandstand (4,200) and temporary. Pitch: synthetic. Conference centre (200), offices and restaurant. Tenants: Cornish Pirates (Chairman Ian Connell), Truro City Football Club, Truro and Penwith College (£2m), Cornwall College and the Royal Cornwall Hospital. Council no longer offering funds. Enabling project of supermarket also given planning permission. Feasibility study: Gardiner & Theobald LLP. Developers: Inox Group (MD Rob Saltmarsh), Henry Boot Developments (Julian Painter).

Capacity 6,000 (10,000 concerts)

Cost £14m

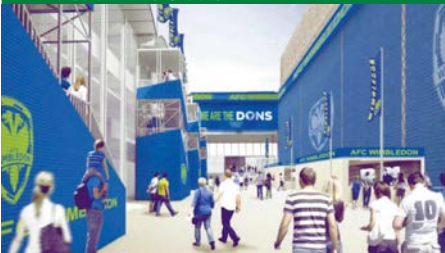
Wakefield Trinity Stadium

Stadium for the Rugby League Wildcats and 100-acre business park near Stanley. Previous project was referred to the UK Secretary of State, which was a blow to receiving a Super League licence. Developer: Yorkcourt Properties.

Capacity 12,000

Cost £19m

Wimbledon AELTC Stadium



English League 1 Football club AFC Wimbledon has AFC Wimbledon have been given the green light to start building their new stadium at Plough Lane. The new development at Plough Lane will bring to the borough an 11,000- 20,000-seater football stadium, 602 much-needed new homes, retail space and a squash and fitness club. Preferred contractor is Andrew Scott Ltd. Expandable design required. House buyer to take over current site. Planning application granted by Merton Council. Phased construction anticipated. A squash/fitness club with contemporary training facilities. Developer: AFC Wimbledon (Chief Executive, Erik Samuelson), Greyhound Racing Authority Acquisition Ltd and Galliard Homes. Parking: 330 car + cycle parking. Consultant: Mott MacDonald.

Capacity 10,000

Cost £25m

Wimbledon, AELTC: No.1 Court



First year completed of three year project to install retractable roof covering entire playing surface. Improvement of public facilities, 15 new hospitality suites on a completely remodelled level, catering facilities, commentary boxes and improved seating. New landscaped entrance plaza and views over the outer courts. Developer: All England Lawn Tennis Club (AELTC). Architects: KSS. Mechanical Engineers: M-E Engineers. Structural Engineers: Thornton Tomasetti. Roofing and cladding: Prater (£8m). Construction: Sir Robert McAlpine.

Mechanical Engineer ME Engineers

ME is providing MEP and lighting design for the roof installation at Court 1.

Capacity 12,400

Cost £70m

Completion 2019

Southend: Southend United Stadium

Southend United FC has submitted a detailed planning application for its proposed new stadium development to Southend Borough Council. The new ground at Fossetts Farm would replace the club's current Roots Hall home and the development would include a 22,000-seat ground, a hotel and flats.

Worcester City FC Stadium

Plans rejected in July 2017 4,400-capacity stadium which would have an all-weather pitch, floodlights and 82 parking spaces at Perdiswell Sports Centre site. Pitch: synthetic. Standing and covered stands. Community use and pool. Club playing at Aggborough, home of Kidderminster in the meantime.

Capacity 4,400

Cost £12m

York Community Stadium

New contractors have been appointed to build York's new community stadium at Monks Cross. City of York Council has confirmed that Buckingham Group will build the 8,000 capacity stadium – which will become the new 'home' to both York City Football Club and York City Knights Rugby League Club. The company replaces builders ISG, who pulled out of the project. Work to begin in October 2017 on all-seater stadium. Combined with community sports facilities, university athletics, swimming pool. Partners (York Teaching Hospital NHS Foundation Trust, York St John University, Be Independent (CIC) and Explore York Libraries and Archives Ltd) will make use of the building on non-matchdays. Project manager: Tim Atkins. Council has approved extra £4m funding. Detailed planning application. Developer/operator: Greenwich Leisure Ltd (Chris Symons). Construction: Buckingham Group.

Capacity 8,000

Cost £44m

Completion 2020

ESTONIA

Tallinn: A. Le Coq Arena

Government funding to increase the capacity of Flora Tallinn's home to act as Estonia National Stadium. Owner: Estonian Football Association.

Capacity 15,000 (+5,000)

Cost €5m

Completion 2018

ETHIOPIA

Addis Ababa: National Stadium

Tender out for contractor. Area: 67,000m². Coffee bean shaped 'Adey Abeba' stadium and sports village. First design dropped. Athletics track, aquatics centre, residential village, sports halls, arenas, retail and commercial zones, and the headquarters of the Federal Sport Commission. Modern ticketing and access control. Developer: Federal Sports Commission. Finance: national government. Design: MH Engineering Plc (GM Mesele Halle).

Capacity 60,000

Cost US\$100m

FINLAND

Helsinki: Olympic Stadium

Renovation and expansion. Widening of track, roofing over stands, new infrastructure. Work must be monitored by Finnish National Board of Antiquities to ensure preservation. Structural engineering: Sweco.

Cost €2m

Completion 2018

FRANCE

Dijon: Stade Gaston-Gérard

Reconstruction of three-storey east stand (5,112). Loges capacity: 204. Architect: Jean Guerville, Sarl Herve Regnault.

Capacity 20,000

Cost €18.27m

Completion 2017

Nantes: FC Nantes YelloPark Stadium

FC Nantes have unveiled images of their planned new YelloPark Stadium, designed by Atelier Tom Sheehan & Partenaires (ATSP) and HKS. Stadium includes a fixed and a retractable roof to improve comfort and optimise the carbon footprint. The roof is composed of two parts: a fixed 25,500m² roof and a retractable central 12,000m² oculus. The system provides shelter to all spectators in case of bad weather. Moreover, the footprint of the perimeter remains as convex and compact as possible to ease circular movement around the stadium while being protected by the roof. The new stadium will benefit from:

40,000 seats; 125m diameter oculus; 37m of free height above pitch; 10 main entrances; 1 giant 360° screen; a 1,000m² museum; 7,000 Kop seats in the same area; 150 media seats; 150 conference room seats; 600m² shop; 25,500m² fixed roof; 12,000m² retractable roof.

Capacity 40,000

Paris: Roland Garros

Enlarging, modernising and rethinking of the historic Roland Garros site at Porte d'Auteuil. French Tennis Federation chose to stick with Roland Garros. Area: 35 acres. Courts: 35 outside. New 5,000-seater stadium and a new press centre. Main Philippe Chatrier court will be redesigned and feature a retractable roof.

Cost €273m

Completion 2017

GABON

Port-Gentil Stadium

Lionel Messi and President Ali Bongo Ondimba laid foundation stone for a new facility that will host matches of the 2017 Africa Cup of Nations.

Capacity 20,000



FC Nantes YelloPark Stadium

GEORGIA**Batumi Stadium**

In holiday destination alongside a newly created avenue in the western part of the city, just a short walk away from the beach. Aiming for UEFA category 4. Design approved, construction tender soon. Concept inspired by Georgia's passion for dance, utilising the motion of 'whirling'. Cladding will be dynamically illuminated at night to represent colours of Georgia, Adjara region or local football team Dinamo (President Otar Redichkini). Funding: Batumi Municipality (Chairman Giorgi Ernakovi). Two-tier grandstands, lower 10,040, upper 9,995. Area: 87,000m². Parking: 1,000 Architect: Bahadır Kul Architects (BKA).

Capacity	20,000
Cost	25m lari (US\$10m)
Completion	2019

GERMANY**Berlin: Hertha Berlin**

Hertha Berlin plans to build a 55,000 capacity football stadium in the Olympiapark. Albert Speer + Partner reviewed over 50 potential sites for a new stadium both inside and outside of the Berlin city boundary.

Completion 2025

Berlin: Union Berlin

Union Berlin plan to increase the capacity of their Alten Försterei stadium to 37,000 by 2020. The work will cost around €38 million and will increase capacity from 22,000 currently. Reconstruction work is due to begin in 2019 and will leave the ground with a standing capacity of 28,700. The number of seats in the stadium will be increased to more than 8,000, meeting German Football League requirements for top division football. Union Berlin currently play in the second division. The reconstruction will keep the stadium, built in 1920, true to its existing style, with the three standing areas in the lower tier remaining in place. An upper tier will be built to accommodate more fans.

Completion 2020

Darmstadt: Merck Stadion

SV Darmstadt 98 (President Rudiger Fritsch) modernising Merck-Stadion am Böllenfalltor. Improvements to accommodation under one roof. Tender for construction going out.

Capacity	19,000 (17,000)
Cost	€33m

Freiburg: SC Freiburg stadium

Proposed by city council in Wolfswinkel. City to vote on project. Operation: SC Freiburg. Finance: public, including infrastructure, club €15-20m.

Capacity	35,000
Cost	€70m
Completion	2018

Jena: Ernst-Abbe Sportfeld

Conversion to football only stadium for Carl Zeiss. Secondary athletics stadium to be built elsewhere (€3m). Premium seats: 500.

Capacity	15,000
Completion	2018

Kiel: Holstein Stadion

Phased capacity expansion. Parking: 1,500.

Capacity	15,000 (expandable to 20,000)
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Leipzig: Red Bull Arena expansion

Capacity increase to meet growing demand. German Bundesliga newcomers RB Leipzig have announced plans to expand the Red Bull Arena after agreeing a deal in principal to buy the stadium. The team, owned by Red Bull, want to increase the capacity of the Stadium, formerly known as the Zentralstadion, to 57,000 from its current capacity of 42,500.

Capacity	57,000 (currently 44,345)
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Oberhausen: Stadion Niederrhein

Northern grandstand demolition. Stands closer to field. New 3,110-capacity grandstand.

Cost	€2.8m
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Regensburg: Continental Arena

New soccer stadium for SSV Jahn, a third division club. Naming rights: Euro 200,000 (5 years). Four grandstands visually pulled together by red facade. Architect: agn Niederbergerhaus & Partner (Stefan Nixdorf). Design and build: BAM Sports.

Capacity	24,000
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Saarbrücken: Ludwig Park Stadium

Planning under way to update home stadium of FC Saarbrücken to DFL standards. Three-storey main stand. Loges: 10. Business Club: 635m². VIP terrace: 170m². Alternative stadium required from January 2016. Architect: GMP. Structural engineer: Schlaich Bergermann. ME: Paul GmbH. Transport: WSV/PCE.

Capacity	20,400
Completion	2020

GHANA**Accra Sports Stadium**

Public-private partnership to renovate. Memorandum of understanding in place. Developer: Ministry of Youth and Sports. Finance: Government GH¢1.5m.

Cost	GH¢12m (US\$3m)
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Bekwai: Edubiase Sports Stadium

Revamp for Premier League team in stadium formerly passed unfit.

GIBRALTAR**National Football Stadium**

Gibraltar national football stadium to be built at site of Victoria Stadium. The Gibraltar FA said an agreement has been reached with the Gibraltar Government and UEFA on a major project that will see both the construction of a UEFA Category 4 National Football Stadium in Gibraltar and other sporting facilities.

Capacity	10,000
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GREECE**Athens: AEK Athens Stadium**

Proposed temple 'Ayia Sophia' of football and of Greek sport according to AEK owner Demetri Melissanidi. At the site of its old stadium at Nea Filadelfia, north of Athens city centre. AEK obliged to develop park as part of deal to use land. Planning also requires construction 4m below street level - height 17.9m. Environment, Energy and Climate Change ministry funding local infrastructure upgrade. Home for AEK and New Philadelphia teams. UEFA 4-star. Religious-leaning architecture, grand central entrance; four corner towers hold up a fabric roof. Two tiers. Club seats: 1200. Suites: 40. Underground parking: 400-500. Parking lot: 250. Area 65,000m². Finance: €20m Attica Regional Authority; €50,000 Ecumenical Patriarchate of Constantinople (symbolic).

Capacity	32,500-34,000
Cost	€65m

Athens: Panathenaikos Stadium

Addition of upper tiers and skyboxes (28) on south and north stands. Cantilevered roof. Aluminium facade. Finance: fan bonds and public.

Capacity	+4,600
Cost	€10-15m

HUNGARY**Budapest: National Soccer Stadium**

Inside the walls of Ferenc Puskas stadium. Track removed to provide space for updated spectator facilities. Athletics, swimming and velodrome next door.

Capacity	65,000
Cost	€300m
Completion	2017

Miskolc: Diósgyőri VTK Stadium

Soccer stadium on current site, to include a new centre of excellence for youth players. DVTK MD Tamas Szabo.

Capacity	15,000
Cost	US\$27m
Completion	2016

IRAQ**Al Diwanayah: Al Sunbula Stadium**

Main stadium plus hotel 3 floors (75 rooms), indoor hall (2,500) secondary stadium (2,000) and training field. Area: 250,000m². Client: Ministry of Youth & Sport. Building Management and Security Systems: Alara Engineering. Landscaping: Turkan Erdem. Architect: Bahadır Kul Architects. Construction: Renaissance Construction.

Capacity	30,000
Cost	US\$100m
Completion	2017

Al-Samawah: Al-Samawah Olympic Stadium

FIFA standard soccer stadium. Design and construction management: Hill International (US\$2.2m). Developer: Ministry of Youth and Sports.

Capacity	20,000
Cost	IQD 70.9bn (US\$61m)
Completion	2017

Baghdad: Al Risafa Sports Stadium

New soccer stadium in Al Sadr City to FIFA standards. Finance interrupted at 40% completion. Now back in place. Area: 250,000m². Owner: Ministry of Youth and Sports. Project management: Hill International (IQD3.3-3.8m). Parking: 2,900. Employs prefabricated building systems for the structure. Steel: Integralia. Construction: Triarena.

Capacity	31,200
Cost	IQD116bn (US\$100m)
Completion	2017

Baghdad: Taji Stadium

For athletics and football. 4-star hotel, golf training area, parking and green spaces. Consulting: Harris.

Capacity	60,000
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Babil, Al Hillah

Owner: Ministry of Youth and Sports. Area: 350,000 m². Parking: 2,545. Architect: Agence D'Architecture A. Bechu.

Capacity	32,000
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Karbala Olympic Stadium

Muted colours and texture to blend with the surrounding mosques and houses. 73 arcades represent the number of martyrs killed in the Karbala tragedy. Two-layer translucent skin allows air to circulate through the concourse. Client: Ministry of Youth. Architect: Bahdir kul architects.

Capacity 30,000

Completion 2017

Najaf Stadium

Football stadium. Landscaping to connect the stadium to the city. Passive cooling towers. Owner: Iraq Ministry of Youth and Sports. Building services, fire protection, sports lighting design: WSP. Construction: Anwar Soura General Contracting. Architect: 360 Architecture.

Capacity 30,000

Cost US\$83.75m

Completion 2017

Nasiriyah Stadium

Main stadium for football, plus athletics stadium with 2,000 seat capacity, training stadium with 500 seat capacity, 4* hotel, in Dhi qar Province in southern Iraq. Area: 55,000m². Architect: Agence D'Architecture A. Bechu. Associate architects: Adil Alkenzawi and Alain-Charles Perrot.

Capacity 30,000

Cost US\$97.5m

Completion 2017

Salah Al Din Stadium

Owner: Iraq Ministry of Youth and Sports. Area: 16.610m². Architect: Agence D'Architecture A. Bechu.

Capacity 30,000

ITALY

Bergamo: Stadio Atleti Azzurri d'Italia

Renovation plan for Serie A soccer club Atalanta. Architect: Mauro Piantelli. Phased renovation starting with the Creberg stand – improved access for disabled supporters. Removal of the glass separating the supporters from the playing field. Finance: Atalanta \$2.4m-\$2.6m, city the rest.

Capacity 22,000

Cost \$3.8m

Cagliari: Cagliari Calcio Football Stadium



Italian Serie A club Cagliari Calcio has chosen the Sportium consortium to design its new stadium. Sportium beat off competition from two other design teams, Tractebel Engie with Gau Arena and J+S with One Works. Sardinia-based Cagliari said that in depth analysis will now take place with Sportium with the aim of defining all the contractual and operational aspects of the work. Sportium is made up of partners Progetto CMR, iDeas, B&L Real Estate and Manica Architecture from the US. Once a design has been decided on, the project will collaborate with engineers Ginevra Balletto, Alessandro Gostland Mario Marongiu and the University of Cagliari.

L'Empoli: New Stadio Castellani

Major renovation for Italian Serie A side, Empoli FC (Chief Executive Francesco Ghelfi). Architect: Roberto Puliti. Removal of running track, staged demolishing of old stands to create seamless bowl. Renovation of main grandstand, introduction of sky boxes. Restaurants, hospitality areas, VIP suites and commercial areas. Naming rights and solar energy provider: Enegan.

Capacity 17,300 (expandable to 20,000)

Cost €11m

Florence: Fiorentina Stadium

Fiorentina have unveiled plans for a new 40,000-seat stadium in Florence, which is set to open for the 2021/22 season. The Serie A club said the €420 million stadium will include all the latest technology and put fans at the heart of the action, just 7 metres from the pitch. The Arup-designed stadium is set to be built on a 48 hectare site at Mercafir in north-western Florence. The complex will include a hotel, a shopping centre, a small training centre and a new railway station.

Capacity 40,000

Cost €420m

Milan: Internazionale Stadium

Proposed new stadium as part of investment from a Chinese consortium. Developer: China Railway Construction Corporation.

Completion 2017

Naples: San Paolo Stadium

Napoli has decided to stay at San Paolo and upgrade with city's help. Napoli will gain ownership rights (99 years) so that it can exploit the stadium commercially. Development of Fuorigrotta area around the stadium for non-matchday events and services. Napoli museum.

Rome, Tor di Valle: Stadio della Roma

AS Roma reached a deal with the city council for the 52,500-seat Meis Architects designed Stadio Della Roma, which will be built in the south-west of the city. Rome's mayor Virginia Raggi has given plans for the new stadium the green light. Plans include a brand new stadium and training centre in Tor di Valle in southwest Rome for the football team AS Roma. Developer StadCo has secured finance (\$34m) from Goldman Sachs for predevelopment costs. Anchors entertainment district Roma Village. Possible sponsorship deal with Etihad Airways. 14,800-seat detached section behind one of the goals for the hard-core "ultra" supporters, replacing the Curva Sud from the Stadio Olimpico. Floating stone facade reminiscent of Colosseum. Polycarbonate roof. Super premium lower bowl club: 600. luxury boxes, plus commercial areas and training grounds outside the stadium. Green: carbon neutral. Transport: 50% public. Currently the club rents the city's Stadio Olimpico for its home matches. The new stadium will be developed and managed by Italian real estate firm Grupo Parsitalia. Finance: naming rights, sponsors and priority seating, bank loans and equity. Feasibility 2013, approval 2014, build 2015. Project manager: Eurnova (Luca Parnasi). Architect: Dan Meis. Pre-opening services: AEG Facilities Global Solutions.

Capacity 52,500 (expandable to 60,000)

Cost €210m (overall project €1.5bn)

Completion 2020

Turin: Stadio Filadelfia

Park and soccer stadium for Fondazione Torino Calcio. Refurb of stadium that was Torino's home from 1926 until 1963 and then training. Crowd-funded project kicked off in autumn 2015. Latest funding has bought the grandstand seats. Architect: Studio Zoppini Associati. Area: 26,500m².

Capacity 3,600

Cost €23m

Completion 2017

KAZAKHSTAN

Aktobe FC Stadium

For football club FC Aktobe to replace 13,500-seat Aktobe Central Stadium. Design and feasibility study for UEFA category four stadium under way, for a planned construction start in 2016.

Capacity 32,000

Completion 2017

KENYA

Kakamega: Bukhungu Stadium

Renovation. First phase ready December 2016.

Cost Ksh 1bn (US\$10m)

Completion August 2017

Manga Nyamira County Stadium

Soccer and athletics stadium. Partners sought.

Capacity 30,000

Cost Sh63m

Mombasa County Stadium

To host 2018 CHAN championships. Phase two of the project will start in July, including infrastructure around the stadium. Developer: Mombasa County.

Completion September 2017

LIBYA

Tripoli: National Stadium

One of the stadiums due to host the African Cup of Nations in 2017 but Libya's civil war has put all development on hold. Two venues are planned for the capital Tripoli. In addition to the National Stadium, the project includes an indoor pool, a multi-purpose arena and Family Sportsworld. The complex, which is being built around a circular basin of approx. 500m diameter, is designed with a symbolism focusing on the number 3 in deference to the historic genius loci, as represented by the city's name (tri-polis = city of three). Architect: GMP – Volkwin Marg and Hubert Nienhoff. Associate Partners: Hans-Joachim Paap, Jochen Köhn. Structural design (outline design): Werner Sobek Ingenieure, Stuttgart. Structural design (scheme and detailed design): Schlaich Bergermann and partner, Stuttgart. Services engineering (outline design): Bechtold Ingenieurgesellschaft mbH, Berlin. Project commissioned by: Masterplan Libya, Tripolis, Kronberg. Client: Lidco – Libyan Investment and Development Co. Tripolis. General contractor: Porr Libya.

Capacity 71,000

LITHUANIA

Vilnius: National Stadium

Ministry of Finance given the job of reviving national stadium project. Financial aid sought from EU.

Cost €50m

LUXEMBOURG

Luxembourg National Football Stadium

Football stadium in Kockelscheuer. Finance: City of Luxembourg and the state. Master plan April 2015, preliminary design September 2015, final plan January 2016, final project June 2016, construction early 2017. Architects: gmp, Beng Architectes Associés.

Capacity 9,600

Cost €59m

Completion 2018

MALAWI

Karonga: Community Stadium

In construction. Construction: Nangaunozge Building Contractor. First phase to complete October 2016.

Capacity 20,000

Completion 2017

Salima Stadium

First phase (K47m) complete. Second phase requires funding for VIP stand, dressing room and toilets.

Completion 2020

MOROCCO

Tangier: City of Sports

City of Sports complex under construction with tennis compound, Olympic swimming pools, multi sports halls, hotels and a football stadium. Construction: Adgeco.

Capacity 4,000

Cost £44m

Completion 2016

Tetouan: Soccer Stadium

Soccer stadium to FIFA standards. Four training pitches. Conference rooms and retail. Area: 35ha.

Capacity 40,410

Cost 700m DH (€64m)

Completion 2018

NETHERLANDS

Amsterdam: ArenA expansion

The Amsterdam ArenA, home of Ajax FC, has kicked off a large-scale renovation project. The lower and upper tier concourses at the stadium will be enlarged. The project is the largest renovation since the ArenA was opened in 1996. Seats in the lower south stand have already started to be replaced with red seating to reflect the team's colours. Project ArenA 2020 consists of three phases. Phase 1 concerns the east side of the stadium. Phase 1 will be followed by phase 2 (south side) and phase 3 (north side). Once these three phases have been completed, together with the already renovated main building, the ArenA will have undergone a 360 degree renovation.

Completion 2017



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Helmond Stadium

Proposed new home for Helmond Sport (to replace Lavans Stadium) and several smaller football teams. Eight outdoor pitches and indoor training hall shared with school. Feasibility study for new stadium due in the autumn.

Rotterdam: Feyenoord Stadium



Proposed new stadium for famous soccer club, in south of city. A masterplan has been approved. The city council has given its backing to architect OMA's masterplan for Feyenoord City, including the New Feyenoord Stadium on the river Maas. Club seeking sustainable solution for community and legacy for De Kuip Stadium site.

Capacity 60-65,000

NIGERIA

Nigeria, Lagos: National Stadium Surulere

Government seeking partners to bring the stadium back to life – built 1972, renovated 1999, closed 2004. Developer: Ministry of Youth and Sports. Construction consulting: Maysu Construction.

Capacity 55,000

Minna: Minna Stadium

Developer: Niger State Government (Commissioner for Sports Daniel Shashere).

Capacity 10,000 (expandable to 15,000)

Cost N2.4bn

Completion end 2016

Plateau State: Jos Stadium

Stalled under construction soccer stadium. State seeking bank loan to complete. Construction: BCC Tropical Nigeria.

Cost N11.3bn (US\$6.5m)

NORTHERN IRELAND

Belfast: Casement Park



For Gaelic sport and Ulster rugby. Ulster GAA has submitted a new planning application to Belfast City Council for a new stadium at Casement Park. Submission follows an unprecedented 32 week consultation period, with 95% of people that responded to the proposed design coming out in favour of the project. Circulation zone of 9,000m² around the perimeter to improve crowd movement. Standing terrace: 8,500. Owner: GAA. Developer: Casement Park project board (chairman Tom Daly). Finance: public. Architect: Populous. Construction: Heron Buckingham joint venture.

Capacity 34,500

Cost £77m

Completion end 2019

Belfast: Cliftonville Stadium

Redevelopment to provide more community facilities for Irish League club. Planning application submitted by Community Interest Company. First phase to replace the Main Stand at Solitude.

Cost £4m

Derry: Brandywell Stadium

Council announcing contractor in November. Work to start immediately. Stadium for Derry City FC with 3,600 seat stand along the Lone Moor Road side. Replaces existing uncovered seated area and the old Glentoran Stand. New changing and treatment facilities. Turf: synthetic 4G. Showgrounds area to be revamped with new greyhound track, bookmaking, spectator and kennel facilities. Demolition and redevelopment of Brandywell Sports Centre. Tenants: Ballymore FC, Oak Leaf boxing and the Over the Hill Club. Funding: city council, regional funds. New greyhound track July 2016 – Dec 2016, 3G pitch Aug 2016 – Dec 2016, Construct New Stand Sept 2016 – Mar 2017. DCFC unable to play home games for possibly last 3 months of 2016 season.

Capacity 6,000

Cost £8.8m

Completion 2017

Belfast: Glentoran Stadium

Glentoran Chairman Terence Brannigan looking to move club away from the Oval, possibly to the Blanchflower Stadium site.

Capacity 8,000

Cost £10m

NORWAY

Sandness Stadium

New football stadium for Sandnes Ulf. Architect: Plank Arkitekt. Area: 4,500m².

Capacity 7,582 (expandable by 2,023)

Cost NOK150m (€16m)

Completion 2018

Valerenga Stadium

New football stadium at former velodrome site opened in September. Includes educational facilities in north-western corner and main stand. Main grandstand has six floors, others are single tier. Four corners can be filled in later to extend capacity. Tenant: Vålerenga IF.

Capacity 17,500-18,000

Completion August 2017

OMAN

North A'Shargiyah: A'Rustaq Sports Complex

Public facilities and football stadium.

Capacity 12,000

South Al Batinah: Al Sa'ada Sports Complex

Expansion of complex and doubling of current stadium's capacity.

Capacity 18,000

Musandam: Khasab Sports Complex

International standard football stadium, hockey, tennis, covered pool (800), gymnasium (1,100).

Capacity 17,000

POLAND

Chorzow: Ruch Chorzow Stadium

Proposed new stadium for Ruch Chorzow soccer team, with realistic capacity, unlike Stadium Slaski. First phase in early 2017 with 4,500 seats. Architect: GMT. Finance: public.

Capacity 16,000

Cost PLN 60m (€14.5m)

Completion 2020

Chorzow: Stadium Slaski

Five years behind schedule, final straight now in sight for cable-roofed stadium. Loss-making operation predicted. New revenue sought.

Capacity 55,000 (athletics), 90,000 concerts

Completion 2017

Jaworzno: Sport Stadium

Athletics stadium with sports and culture complex nestled in a quarry. For local and regional track and field events and training camps. The design is inspired by the rich geological landscape of the region and to resemble a rock and six free-standing buildings evoking scattered boulders. Sports facilities, restaurants, exhibition space and high-end hotels for tourists, spectators and athletes. Area: 4,200m². Architect: Mateusz Tański & Associates (design competition winner). Developer: Jaworzno City.

Capacity 1,000

Cost 10m zloty (US\$2.5m)

Lodz: Wzdw Stadium

Polish fourth division football team Widzew Łódź has played its first match in its new 18,000 seater stadium. The new Stadion Wzdw has been built in the city of Łódź on the site of the club's former home, which was demolished in 2015. Plans were announced for the new venue in October 2014 and it has taken two years to build. The West Grandstand is the main stand and contains the changing rooms, gym, 24 corporate boxes, eight commentary boxes and two TV studios. The other three stands are simpler and include space for 900-1,200 visiting supporters.

Sosnowiec: Zagłębiowski Park Sportowy

Stadium plus indoor arena for 3,000 and covered ice rink for 2,500. Three phases, following approximately a year of detailed design work. Design competition won by JSK Architekt.

Capacity 12,000 (expandable to 15,000)

Completion 2019

Warsaw: Polonia Warszawa Stadium

Early stage proposal for lower league football club. Office building development to help fund new stadium, retaining only historical western façade. Funding: private.

Capacity 20,000

Wroclaw Olympic Stadium

Work completed on rebuild of Olympic Stadium to host World Games and speedway. Retention of some historical elements, including floodlight masts. Developer: Municipality of Wroclaw.

Capacity 11,000

Cost PLN 130m (\$32m)

Completion 2017

QATAR

Al Khor City: Al Bayt Stadium

Modular seating being installed. Construction at the 60,000-seat stadium, which is designed like a traditional Arabian tent, is now in full swing with the commencement of installation of the first fix of approximately 2,500 seats at the north stand of the stadium. Possible semi-final venue for the 2022 FIFA World Cup. A modular design includes an upper tier of removable seats. Retail spaces and restaurants will sit alongside landscaped paths for use by local residents and there will be dedicated women-only facilities within the complex. Green: energy-efficiency and green building materials, with renewable energy to power the venue. Owner: Supreme Committee for Delivery & Legacy and the Aspire Zone Foundation. Construction: Qatari contractor Galfar Al Misnad will construct the stadium and precinct in a joint venture with two Italian firms, Salini Impregilo Group and Cimolai. Construction supervision consultant: KEO International Consultants Design Consultant: Dar Al-Handasah. Landscape architect: Polis Group. Project Manager during design stage: Projacs.

Mechanical Engineer ME Engineers

ME is providing MEP design.

Capacity 32,000 (70,000 for World Cup)

Completion September 2018

Al Rayyan Stadium

One of the venues for the Qatar 2022 FIFA World Cup and new home for Qatar Stars League champions Al Rayyan on the site of Al Rayyan Sports Club's existing stadium, Ahmed Bin Ali Stadium. The upper tiers of the 40,000 seater stadium will be demounted after the 2022 FIFA World Cup in order to retain 20,000 seats in legacy mode. Ornate façade is a contemporary take on traditional Naqish patterns specific to Qatari culture. Green: recycling old stadium materials, renewable energy, lightweight building design, careful selection of materials, and energy and water efficiency measures. Aiming for GSAS and LEED. Developer: Supreme Committee for Delivery & Legacy (project manager Abdulla Al Fehani). Consultant: AECOM. Lead Design Consultant: Ramboll. Architects: KSS and Pattern Design (Dipesh Patel). Main contractors: Al Balagh Trading & Contracting, Larsen & Toubro (M V Satish). Design execution: KSS and Schlaich Bergermann.

Capacity 40,000

Completion Early 2019

Al Thumama Stadium

World Cup stadium on site already comprising four outdoor training pitches and office facilities used by the Qatar Football Association Technical Committee. Community engagement with residents about the stadium development may result in a clinic, green spaces, retail area and sporting facilities, including a walking and cycling track. Area: 515,400m². Design consultant: AEB Group (CEO & Chief Architect Ibrahim Mohamed Jaidah). Project management: TIME Qatar.

Capacity 40,000 (20,000 legacy)

Al Wakrah Stadium

The development of Al Wakrah Stadium – a proposed 2022 FIFA World Cup tournament venue – has taken a major step forward with the installation of the final piece of the roof structure. Weighing 378 tonnes and measuring 92 metres, the steel structure – known as an ‘oculus beam’ – sits 50 metres above pitch level. It will connect and support the entire roof, while providing maintenance access to some of the retractable parts of the structure. Two 540-tonne pillars, resembling curved hockey sticks, are the main support for the retractable roof of the arena. Upper tiers will be removed after the World Cup. Area (precinct): 586,000m². Sports centre & community hub. Tenant: Al Wakrah Sports Club. Green: renewable energy & structural design efficiency; targeting GSAS and LEED certification. Developer: Qatar 2022 Supreme Committee (Hassan Al Thawadi, Secretary General). Project manager: KEO. Design consultant: AECOM. Architect: AECOM and Zaha Hadid Architects. Programme manager: CH2M Hill. Enabling works: HBK Contracting Co. Main contractor: MIDMAC in a JV with PORR Qatar.

Capacity 40,000 (World Cup) 20,000 (legacy)
Completion 2018

Doha: Sport City Stadium

Design draws inspiration from traditional Arab tents. A retractable roof, partly retractable pitch and retractable stands for multi-use after hosting 2022 FIFA World Cup.

Capacity 47,560

Foundation Stadium

Soccer stadium for FIFA World Cup™ 2022. Plus swimming pool and indoor pavilion on same site. Green: photovoltaic and solar thermal panels. Aiming for LEED Gold. Design consultant: RFA Fenwick Iribarren. Project manager: Astad. Construction: Four companies, led by Cyprus-based contractor Joannou & Paraskevaides (J&P), are teaming up in the Main Contractor role: J&P Qatar WLL, Conspeil Qatar WLL, J&P-Avax S.A and J&P (Overseas) Ltd. who have been awarded the contract as a joint venture.

Capacity 26,000 (40,000 for World Cup)
Completion Q3 2019

Khalifa International Stadium

Work has completed on the refurb for 2022 World Cup. Also 3-2-1 Qatar Olympic and Sports Museum. New building has been added to the stadium's east wing, and which contains food courts, shops, multi-purpose rooms, VIP lounges and a health centre. Roof: tensile membrane (Birdair). Roof installation: Taiyo Middle East. Project manager: Projacs. Design consultant: Dar Al-Handasah. Main contractor: MIDMAC in a JV with PORR Qatar.

Capacity 40,000

Lusail City: Lusail Stadium

Construction is progressing rapidly, according to the Supreme Committee for Delivery & Legacy (SC). Work on the substructure of the stadium has surpassed 75% and the west stand, which contains the VIP, VIP and media tribunes, among other elements, is visibly rising up from the ground to reach an imposing elevation of more than 70 metres. The installation of the west stand's precast elements, which will support the bleachers on which fans will sit, has also now commenced. Largest venue for the 2022 FIFA World Cup Qatar and the site of the opening ceremony and the Final. Open-air pitch that can be cooled to an optimal 26 degrees Celsius using cooled and shaded spectator stands and state-of-the-art green technologies. Owner: The Supreme Committee for Delivery & Legacy. Architect: Foster + Partners (design competition). Consultants: ARUP, Populous.

Capacity 80,000

Ras Abu About Stadium

Qatari firm HBK Contracting Company (HBK) has been awarded the main works contract for Ras Abu About Stadium. The 40,000-seat venue will be built using modular building blocks, making it the first fully demountable FIFA World Cup stadium in history. Located in a 450,000m² water-front site with exceptional views over Doha's skyline, the stadium will host matches up to the quarter-finals in 2022. On waterfront with a 'design for legacy' concept with an ability for it to become part of a larger mixed-use neighbourhood after World Cup. Developer: Supreme Committee for Delivery & Legacy. Area: 450,000m². Parking: 6,000 (2,000 in legacy). Architect: Populous. Project management: Time Qatar (Turner Construction).

Capacity 40,000

ROMANIA**FC Botosani Stadium**

New stadium proposed for Liga I club. City support in seeking funding.

Capacity 11,000
Cost €18m

Bucharest: Ion Oblemenco Stadium

Construction completed on stadium replacement of Craiova's stadium to create UEFA 4-star venue. The two-tier concept design includes Club/VIP seating. Roof form inspired by Brancusi work Miss Pogany. Architectural lighting for night impact. Area: 56,900m². Green: photovoltaics, ground source heating/cooling. Fencing arena in grandstand. Training ground with athletics (5,000) on same complex. Soft and hard landscaping of complex. Architect: DICO si Tiganas.

Capacity 30,000
Cost €50m
Completion 2017

Bucharest: Dinamo Stadium

To replace Stefan cel Mare stadium, possibly to host Euro 2020 games. Developer: Dinamo Bucharest (chief executive Elisabeta Lipa). In northern Bucharest. Underground parking: 1,087. Large public plaza south of the stadium. Finance: Romanian government. Upper tier 17,350; lower tier 10,350. Skyboxes: 20 (2,015). Media: 450.

Capacity 30,000

Targu Jiu: Targu Jiu Stadium

New-build home for CS Pandurii Targu Jiu on old stadium site. Stadium, hotel rooms, conference rooms and a car park. Area: 37,500m². Architect: DICO si Tiganas.

Capacity 15,000
Cost €20m

RUSSIA**Ekaterinburg: Ekaterinburg Arena**

On 21 June, France faced Peru at the Ekaterinburg Arena, the westernmost destination at Russia 2018. Parts of the old venue that have been preserved are now fully restored and act as cultural heritage. Contractor: Sinara Development. Construction cost: 12,721bn RBL One of the twelve stadiums to be used for the FIFA World Cup 2018, all of which require construction or refurbishment. Developer: Ministry of sport. Technical construction arm: Sport Engineering.

Capacity 35,000
Cost US\$320m
Completion end 2017

Kaliningrad: Stadium Kaliningrad

On Oktyabrsky island. The first match of the World Cup at the Kaliningrad Stadium was on 16 June between Croatia and Nigeria. Probable home for Baltika FC. Site preparation: AO Crocus International and FGUP "Sport-In". Design and construction manager: Crocus International. Design cost: 523.86m RBL. Construction cost 18.5bn RBL. Area: 140ha. Jobs: 88. One of the twelve stadiums to be used for the FIFA World Cup™ 2018. Developer: Ministry of sport. Technical construction arm: Sport Engineering.

Capacity 35,000 (25,000 legacy)
Cost US\$287m
Completion end 2017

Krasnodar: FC Kuban Stadium

Stadium for soccer team but capable of staging other events including rugby. Angled roof to retain noise. On podium with surrounding landscaped parking. Envelope design influenced by Russian artist and architect El Lissitzky. Plates of solid and perforated metal peel away from the bowl. Facade material: TECU Gold. Architect: AFL Architects, Tecnion, Syntesis Rus.

Capacity 45,000

Moscow: Luzhniki Stadium

The venue hosting the Opening Match and Final of the 2018 FIFA World Cup Russia™ has received a final certificate of pass from international green standard BREEAM. Remodelling of the 60-year-old stadium is complete. Jobs: 1784. Tear up and start again to create a new stadium. Construction manager: Big Sports Arena Luzhniki (Moscow Department of Construction). Pitch: SIS. Will host opener and final of FIFA World Cup 2018.

Capacity 81-88,000
Cost US\$550m
Completion February 2017

Moscow: VTB Arena

Stadium and arena combination on site of Dynamo stadium, designed to retain historic elements of Petrovsky park. Also two levels of retail and one of parking. Developer: Dynamo Management Company. Architects: MANICA Architecture and Speech. Construction: Codest International (US\$707m).

Mechanical Engineer ME Engineers

ME provided LEED, sustainable design and energy modeling in early design stages.

Capacity 27,000 (stadium)
Completion 2017

Nizhny Novgorod: Volga Arena

The Nizhny Novgorod Stadium was the location for Sweden-Korea Republic on 18 June. Tenant team: FC Volga Nizhny Novgorod, moving from Lokomotiv Central Stadium (17,850). Stands will have gas infrared heaters. Green: BREEAM standard (Jones Lang Lasalle). Developer: Ministry of sport. Technical construction arm: Sport Engineering. Construction: Stoitransgaz (Director Vadim Gurinov).

Capacity 35,000 sport
Cost 19bn rubles (US\$388m)
Completion September 2017



Novosibirsk: Sibir Football Stadium

UEFA Category 3 (1A Russian ranking) stadium for FK Sibir in the north of the city in development area. Two-tier grandstands, business zone in west stand, heating in some areas (average temperatures of below 0° from October to May).

Capacity	15,000
Cost	€11.2m

Saint Petersburg: Saint Petersburg Arena

On St. Petersburg's Krestovsky Island. Construction cost: 34.9bn RUB (US\$550m). New home for Zenit north west of the city. 'Space ship' facade taking shape. For 2018 FIFA World Cup. Will be only Eastern European stadium with a removable field and sliding roof to allow it to host sporting or cultural events in all conditions. Height: 75m. Diameter: 289m. Area: 287,000m². Commercial: 50,000m². Architect: Kisho Kurokawa. Construction (for most of job): Transstroy. Glazing (120,000m²): AGC.

Capacity	68,000 sport, 77,000 concerts
Cost	US\$1.1bn
Completion	February 2017

Rostov am Don: Rostov Arena



Rostov-on-Don welcomed Brazil and Switzerland for their game on 17 June. Client: FGUP "Sport Engineering". Contractor: AO Crocus International. One of the twelve stadiums to be used for the FIFA World Cup 2018, all of which require construction or refurbishment. Developer: Ministry of sport. Technical construction arm: Sport Engineering. Construction: Crocus. Roof: Ferrari membrane.

Capacity	45,000
Cost	US\$320m
Completion	December 2017

Samara: Samara Arena

The World Cup began at the Samara Arena with Costa Rica's fixture against Serbia on 17 June. Tenant: Krylia Sovetov (Wings of the Soviets) football club. One of the 12 stadiums to be used for the FIFA World Cup 2018. Green: BREEAM standard (Jones Lang Lasalle). Developer: Ministry of sport. Technical construction arm: Sport Engineering.

Capacity	45,000
Cost	US\$320m
Completion	December 2017

Saransk: Mordovia Arena

Client: FGUP "Sport Engineering". Contractor: PSO Kazan. New stadium for FC Mordovia Saransk, recently promoted to the Premier League, on the eastern edge of the small city of Saransk. One of the twelve stadiums to be used for the FIFA World Cup 2018, all of which require construction or refurbishment. Developer: Ministry of sport. Technical construction arm: Sport Engineering.

Capacity	28,000 (45,000 for World Cup)
Cost	US\$320m
Completion	December 2017

Sochi: Fisht Stadium

Conversion completed from Winter Olympics mode to be one of the twelve stadiums to be used for the FIFA World Cup 2018. Remodelling of the stadium has proceeded according to an approved construction and installation time-schedule. Roof removed. Additional tiers and sports infrastructure added. Developer: Ministry of sport. Technical construction arm: Sport Engineering.

Capacity	45,000
Cost	US\$100m
Completion	end 2016

Vladivostok Stadium

Proposed soccer stadium as part of sports and leisure development by local authority.

Capacity	16,000
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Volgograd: Volgograd Arena

One of the fixtures at the Volgograd Arena was Tunisia-England on 18 June. Built on site of Central Stadium. Part of sports complex. Basketball to be added. Green: BREEAM standard (Jones Lang Lasalle). Developer: Ministry of sport. Technical construction arm: Sport Engineering. Construction: Stoitransgaz (Director Vadim Gurinov).

Capacity	45,000
Cost	15-20bn rubles (US\$431-575m)
Completion	November 2017

SCOTLAND

Aberdeen FC Stadium

Aberdeen FC has been granted official planning permission for a new stadium and training complex at Kingsford, near Westhill. Aberdeen City Council's planning department has formally approved the development and the club plans to begin construction of the 20,000-capacity stadium in June 2018. Phase one will include the construction of the training pavilion, groundsman's accommodation, three professional training pitches, two 3G pitches, a full size and a half size grass pitches, the latter being mainly for use by AFCCT. Club previously worked on outline plans for stadiums at Loirston Loch and King's Links but both failed. Finance: sale of Pitodrie stadium for development, council contribution, grants, naming rights. Construction: McLaughlin & Harvey Construction (preferred bidder). Consultant: Gardiner & Theobald. Architect: Miller Partnership.

Capacity	20,000
Cost	£50m
Completion	2019

Dumbarton: Community Stadium

For Dumbarton Football Club at Young's Farm, which is bounded by the River Leven to the east, the A82 to the north and a railway line to the west. Hospitality and dedicated training facilities, plus additional playing pitches for community use and car parking. Non-football related uses could include gym/leisure facilities, a hotel, conferencing facilities, a restaurant, a shop and offices.

Capacity	4,000 (1,000 standing)
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East Kilbride Stadium

Proposal by East Kilbride Community Trust (EKCT) to build a multi-million pound stadium to replace K-Park for senior teams. Location could be South Lanarkshire Council-owned site at Langlands West. Council considering proposal. Local campaign in support under way.

Capacity	4,000
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Edinburgh: Academicals Rugby Club

Edinburgh Academicals Rugby Club, the second oldest club in the UK, has confirmed that it will build its new facility in Stockbridge, Edinburgh. It will contain conference facilities and a rugby museum, with associated retail. Planning agreed 2013, S75 with City of Edinburgh Council 2014. Planning permission granted. Finalising design and layout, researching best practice, setting leasing arrangements, applying for building warrants. Architect: Michael Laird Architects. Jobs: 100.

Capacity	5,000 (2,500 seated)
Cost	£8m
Completion	2017

Edinburgh: Edinburgh Rugby

Scottish Rugby has applied for planning permission to install a new stadium in the grounds of BT Murrayfield, which will have a capacity of up to 7,800. The development is intended to be the new home of Edinburgh Rugby and would be located on a section of land currently used as training pitches. A detailed planning application has been submitted to City of Edinburgh Council to provide a fan-focussed playing venue in the city that will incorporate a new 3G surface and covered spectator stands around all four sides of the ground. Edinburgh will play its home matches on the international pitch at BT Murrayfield for the coming 2018/19 season, with the aim of commencing the 2019/20 campaign in the new purpose-built venue. Scottish Rugby has designed the project using flexible infrastructure and is open to making the space available to other users from the wider rugby community in Scotland, and the possibility of other sports as well.

Capacity	7,500
Completion	2019

Edinburgh: Heart of Midlothian Stadium

New main stand (7,000) to replace the 1914 Archibald Leitch stand on the McLeod Street side of the stadium. Public consultation on plans undertaken. Construction without relocation. During a 'fitting out' period the players will use new changing facilities beneath the Wheatfield Stand, where temporary office and retail space is also being created. Office, shop, ticketing facilities, new hospitality spaces and Tynecastle Nursery School. Architect: James Clydesdale. Finance: club £3m, benefactors £2.5m, commercial: £0.5m, cash available £6m.

Capacity	20-21,000
Cost	£12m
Completion	September 2017

Edinburgh: New Meadowbank Stadium

Vision for refurbished venue. February 2015 report estimated project cost was £43m with a funding shortfall of between £11.3m and £19.8m. Shortfall now at £6.8m Outdoor athletics track with seating for 500, indoor 60m six lane athletics track with jumps area, outdoor throws area, 3G synthetic sports pitch or grass pitch in the centre of the outdoor athletics track for football, rugby and other pitch sports, outdoor 3G synthetic sports pitch, eight badminton court sports hall with 500 permanent seats plus bleachers, four badminton court sports hall with 500 permanent seats, gymnastics hall, gym, studios, changing facilities, café and meeting rooms. Aim is to find finance, appoint development team by February 2016, demolition autumn 2016.

Cost	£43m
Completion	Q1 2018

Glasgow: Celtic Park

Celtic Football Club's plans to expand Celtic Park and build new hotel, museum, retail and ticket office facilities have been given the green light. The Scottish champions unveiled plans earlier in 2017 to regenerate the area around Celtic Park and those have now been approved by Glasgow City Council. The hotel will be based on London Road, outside the main stand of Celtic Park and across from the Emirates Arena.

Glasgow: Partick Thistle FC

Partick Thistle FC are pushing ahead with plans to build a dedicated training ground for the club in Glasgow. The Scottish Premiership team has agreed a deal with Three Black Cats, a company set up by the Weir family for long term investments, to build the new £4 million facility. Three Black Cats was seeking a new investment project and has agreed to work with Partick Thistle to design and build a new training ground to the Club's specification. It will then be leased to Thistle while remaining in the ownership of Three Black Cats. A location has yet to be found.

Paisley: St Mirren FC

New in Ferguslie area. Seeking buyer of Love Street ground.

Capacity	10,000
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SLOVAKIA

Bratislava: National Stadium

Public/private partnership lost private investor. Government has agreed to purchase the stadium from current owner Ivan Kmotrik once it's built. Home to national team and Slovak Bratislava. International tender for design and construction of UEFA standard stadium to play queen internationals. Finance: government subsidy. Construction: Strabag (€42m)

Capacity	23,000
Cost	€75m
Completion	2018

Kosice: MFK Kosice Stadium

New soccer stadium for Fortuna Liga club. Area: 60,000m². Operating company: Kosice 85%, club 15%. Funding: city, state (€4m).

Capacity	9,080
Cost	€15m
Completion	2017

Trencin: Stadion na Sihoti

Phased replacement stadium for AS Trenčín. Municipality to provide land and infrastructure. Finance: AS Trenčín, Slovak FA, Slovak government.

Capacity	12,000
Cost	€7.4m
Completion	2018

SOUTH AFRICA**Krugersdorp: Amakhosi Stadium**

Proposed, revised and stalled new stadium project for Kaizer Chiefs. Developer: Lefika.

Capacity	35,000
Cost	R700m

SPAIN**Barcelona: Camp Nou Stadium**

Designed to facilitate circulation and achieve diverse urban usage in the Barça Campus. The stadium is the biggest component of €600m (US\$651.9m, £467.4m) sports district called Espai Barça, which also includes the New Palau Blaugrana multi-use arena. Scheduled to start in the 2017/18 season. Architect: Nikken Sekkei + Pascual i Ausió Arquitectes (design competition winner – lead architects Joan Pascual and Takeyuki Katsuya). Sport design services: Manica Architecture. Super-upgrade for FC Barcelona's Catalan home voted for by club members in referendum. (Previous Foster+Partners design didn't go ahead.) Third tier on west side and roof (47,000m²) over all stands. Jury of club officials and local architects reviewed proposals of eight design teams. Stadium specialist consultants: ISG, AEG, ICON Venue Group and Ryder Levett Bucknall. As well as a reconfigured spectator bowl, there will be a new ring of boxes and restaurants overlooking the pitch, along with 'superboxes' and other VIP services between the first and second tiers. The quality of the VIP services will be vastly improved both in terms of quantity and quality (3,500 new seats would create a total of 5,700 luxury seats).

Capacity	105,053
Cost	€360m
Completion	2020

Barcelona: Johan Cruyff Stadium

Training stadium for FC Barcelona at the Ciutat Esportiva training ground. FC Barcelona has kicked off construction work at the club's new training centre – the Johan Cruyff Stadium – in the city. The stadium, named after club legend Cruyff, will be the home of Barça B, the Barça Women's team and the Under-19 team for Youth League matches. The shape will be asymmetric with a two-level grandstand. There will be 1,000 seats in the second level of the main grandstand and 5,000 seats on the entire, 360-degree lower level. The corners will be rounded to bring the fans as close to the action, and the players, as possible. UEFA category III with covered terraces. Parking: 600. Architect: Batlle i Roig Arquitectes.

Capacity	6,000
Cost	€12m
Completion	2018

Madrid: Santiago Bernabeu

Remodelling for Real Madrid. Club currently working with lawmakers on getting permission to build. Retractable roof added to the design. Architect: GMP Architects and L35 Ribas (winners of the 'International Tender for Architectural Ideas for the remodelling of the Santiago Bernabéu'). New skin, retail mall and sliding roof. Planning permission sought. Funding: commercial sponsorship (International Petroleum Investment Co.).

Capacity	80,000
Cost	US\$400m
Completion	2020

San Sebastian: Estadio Anoeta

Four-phase upgrade while continuing to operate. Removal of athletics track and new roof, followed by grandstand rebuilds. Municipality hiring construction manager to handle contracts.

Capacity	32,000
Cost	€40m
Completion	2019

Sevilla: Estadio Benito Villamarín

Tender for the construction of new stand (14,700) for Betis is under way. Old stand (8,500) demolished already.

Cost	€16m
Completion	2017

Sevilla: Estadio Ramón Sánchez Pizjuán

Modernisation over two years for Sevilla FC. Redesign of the entrance area, new seats, concrete treatment, new scoreboards and floodlights, improved facilities for players and disabled supporters.

Completion	2017
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Valencia CF Stadium

Spanish La Liga club Valencia CF have enlisted heavyweight consultants Deloitte as they look to push ahead with a move to a new stadium. Deloitte will be responsible for the overall business plan, including the sale of assets, restructuring of debt and financing of completion of the new stadium. Plans are for it to open for the 2021/22 season. Half finished and on hold since 2008 after financial difficulties of club. Three-tier (22,000 bottom tier, 18,000 middle, 25,000 upper) soccer stadium in NE Valencia. Architects: Reid Fenwick Associates. Engineer: Arup Sport. Mestalla stadium to be sold to property developers.

Capacity	65,000 (75,000)
Cost	€200m (€300m)

SWAZILAND**Siteki Soccer Stadium**

Developer: National Football Association of Swaziland (NFAS). NFAS reported that it is trying to secure a title deed for the construction of a stadium in the Shiselweni region.

SWEDEN**Helsingborg: City Stadium**

Project to rebuild the Olympia soccer stadium. Project manager: Karnfastigheter (Catharina Branden). Construction: Peab AB (US\$44.4m).

Cost	US\$140m
Completion	mid-2017

SWITZERLAND**Lausanne Football Stadium**

Rectangular Tuilliere Lausanne stadium as part of larger redevelopment in north of city. Training areas, restaurant and media. Architects: MLZD and Sollberger Boegli.

Capacity	12,000
Cost	€70m
Completion	2019

Schaffhausen: FCS-Park

New stadium for FC Schaffhausen (President Aniello Fontana).



Capacity	8,000
Cost	CHF 60m
Completion	2017

Zurich football stadium

Proposed soccer-dedicated stadium. Possible standing area. Developer: city.

Capacity	16,000 (international), 20,000 (domestic)
Cost	CHF 150m
Completion	2017

TANZANIA**Kaunda Stadium**

For Yanga soccer club. Start June 2016. Contractor: Beijing Construction Engineering Group Co Ltd.

Capacity	40,000
Cost	\$20m

TURKEY**Adana: Adana Stadium**

For soccer club Adanaspor. Suites: 49 (552). Club seats: 992. Media seats: 178. Officials seats: 196. Funding: public. Concrete bowl complete, roof steel being erected.

Capacity	36,117
Cost	TL 107m
Completion	2017

Sakarya Stadium

Concrete bowl, steel roof. Roof cladding going on. Parking: 1445. VIP: 661. Area: 136,000m². Architect: Alper Aksoy Architects (A.Arch). Construction: Ahes Construction.

Capacity	28,710
Completion	2017

Trabzonspor: Akyazi Stadium

Main construction complete. Roof cladding going in, pitch yet to be installed. Replaces Huseyin Avni Aker stadium. Built on artificially created land on the shore of the Black Sea.

Capacity	42,000
Completion	2017

TURKMENISTAN**Ashgabat: Olympic Stadium**

Refurb for athletics and soccer stadium ahead of Asian Indoor and Martial Arts Games. Architect: AFL.

Capacity	48,000 (35,000)
Completion	2017

UGANDA**Ruti: Mbarara Stadium**

Football stadium next door to Mbarara-Kabale Highway. Government has entered talks with Chinese firm Anhui Foreign Economic Construction Group Company (AFECC) to create plans. 500 seater pavilion, protected perimeter fence, modern dressing rooms, boardrooms, stores.

Capacity	15,000-20,000
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UNITED ARAB EMIRATES**Abu Dhabi Stadium**

Developer Mubada has prequalified five companies to build a new sports stadium with retractable roof as part of the Capital City District development next to Khalifa City.

Capacity	65,000
Cost	US\$1bn

Dubai, Al Aweer: Rashid Al Maktoum Stadium

Elevated in a diagrid bowl. Playing field 18m above entry plaza. Open tensile roof. Skin allows in air but not sun and sand. Water features will create natural thermal sink to cool air. Landscaping to block hot wind. Site area: 120,000m². General seating: 23,116 upper, 6,688 lower. Suites: 1,642 capacity. VIP: 8,941. Design and construction: Dar Group and Perkins+Will. Warm-up area, athletic training hall. Parking: 5,000. Sport museum (1,500m²). Multi-purpose hall (3,500m²), exhibition halls and conference facilities, shops and restaurants. Developer: Dubai Sports Council. Named after His Highness Shaikh Mohammad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai.

Capacity	60,000
Cost	AED 3bn (US\$817m)

Dubai: Al Wasl Sports Club

Proposed upgrade to become air-conditioned stadium. Developer: Dubai Sports Council.

Capacity	25,000
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WALES**Ebbw Vale: Circuit of Wales**

The proposed Circuit of Wales motor racing track suffered a possible fatal blow when the Welsh Government refused to guarantee a £210 million loan for the project. The circuit is planned to be built in an area near Ebbw Vale and has a deal to host the British MotoGP round until 2020. Developer: Heads of the Valleys Development Company. Construction (preliminary): FCC and Alun Griffiths Contractors.

Capacity	15,000
Cost	£280m

Newport: Dragons Stadium

New stadium on site of Rodney Parade going through planning permission. Includes an 84-room hotel, 105 student flats, restaurant, conference facilities, offices and public gym. Architect: S&P. Planning: RPS. Cost consultant: Gleds. Transport: Pinnacle. Boxes: 20.

Capacity	15,000
Cost	£40m





ZAMBIA

Southern Province: Livingstone Stadium

Soccer stadium and community sport facilities in sight of the Victoria Falls.

Capacity 30,000

Completion 2017

ZIMBABWE

Tsholotsho Stadium

Football stadium for Tsholotsho FC who are playing temporarily at White City during the first half of the Castle Lager Premier Soccer League season.

Contractor: JR Goddard.

Completion 2016

Victoria Falls Cricket Ground

Local council has granted planning approval for a stadium near the iconic site to become country's third international Test ground. Also home for domestic side Matabeleland Tuskers and open for touring teams to practise. Floodlights proposed.

Capacity 12,000

AMERICAS

ARGENTINA

Buenos Aires: Mary Teran de Weiss Stadium

Redevelopment of tennis stadium with retractable roof. In Parque Roca.

Capacity 14,000

BAHAMAS

Andre Rodgers Baseball Stadium

Ballpark named after the first Bahamian to play in the major leagues, plus auxiliary practice fields to the east of the stadium, locker rooms, meeting rooms, physical/therapy/training rooms; vendor spaces, eight luxury boxes, state of the art audio/visual scoreboard, parking and offices for the sport's partner, the Bahamas Baseball Federation. East of the Government High School in the Queen Elizabeth Sports Centre. Original was demolished in 2006 to facilitate construction of the new TAR National Stadium. Budget for statutory utility connections, baseball accessories and installations, digital/video scoreboard and installation, supply and construction of synthetic field, stadium lighting, stadium 'Smart Technology' design, PA system, AV system and security/surveillance system install: \$4m. Construction: Woslee Construction (\$21.352m). Architect: Arconcepts (\$3.96m).

Capacity 4,500

Cost US\$21m

BRAZIL

Rio de Janeiro: Olympic Stadium

Temporary capacity update of 2007 Pan-American Games stadium for Olympic athletics.

Capacity 60,000 (45,000)

CANADA

Calgary: CalgaryNEXT

Proposal for a new stadium to replace the Saddledome and McMahon Stadium. New field house, NHL arena, and football stadium in the West Village. Evaluation by city under way.

Cost C\$890m

Montreal: Baseball Project

Study funded by a group comprised of the Board of Trade of Metropolitan Montreal (BTMM), the Montreal Baseball Project (MBP), EY and BCF LLP. Costed as \$500m to buy team and \$500m for an open-air ballpark.

Capacity 36,000

Cost C\$500m

GUYANA

Soccer stadium plus training fields, a co-ed sports academy, amphitheater, golf course, resort and retail. Architect: Baker Barrios Architects Inc.

Capacity 24,000

Cost US\$30m

UNITED STATES OF AMERICA

AL, Auburn: Jordan-Hare Stadium

Proposed renovation at Auburn University of the North end zone to include expanded concourse and walkways, club seating, additional concessions, new locker rooms, recruiting lounge. Big screens: 2. Currently working with architects and engineers to meet projected budget.

Cost US\$145m

Completion 2018

AL, Birmingham: University of Alabama Stadium

New horseshoe-shaped, on-campus football stadium with a downtown view, for UAB Hornets (Athletics Director Brian Mackin). Capacity: 27,511 (seats), 2,500 (lawn end zone). Suites: 33. Loge boxes: 24 (4). Parking for 300. Finance: \$60m bonds, \$15m donations.

Cost US\$75m

AL, Jacksonville: JSU Baseball Stadium



Ballpark for Jacksonville State University Gamecocks (Athletics Director Greg Seitz). Grandstand with a shade canopy, media box and a game operations centre. Suites: 4. New clubhouse with locker room, lounge, team meeting area and athletic training treatment area. Clubhouse attached to an enclosed training facility that will allow for batting and pitching workouts. New step-down team dugouts, bullpens, new coaches offices and meeting space. Finance: donations. Architects: Davis Architects, Inc., architect Bill Whittaker.

Capacity 1,000

Cost \$7.5m

Completion 2018

AL, Mobile: Uni of South Alabama Stadium

The University of South Alabama (Director of Athletics Dr. Joel Erdmann) has selected three consulting firms to assist with the exploration of the financial, logistical and infrastructural requirements associated with the possible construction of an on-campus football stadium. Consulting: CDFL Architects and Engineers, Populous and Hunden Strategic Partners.

AR, Fayetteville: Razorback Stadium

Arkansas, Fayetteville: Expansion project for Donald W. Reynolds Razorback Stadium at University of Arkansas. New loge boxes, suites, club seating and club areas, plus concessions and restrooms in the north end zone. New elevators and updated security and safety systems. Finance: athletics revenues, capital gifts and bond proceeds from a future bond issue.

Cost US\$160m

Completion 2019

AZ, Phoenix: Sun Devil Stadium

Redevelopment for home of Arizona State University sport. "Double Inferno" upgraded student section, enhanced seating and legroom, more restrooms and concession options, technological upgrades, improved air and traffic flow through the venue, a connection to the surrounding landscape, additional premium seating options, and a new video board and sound system. Phase 1: new student section in the south end zone, permanent stadium seating, student section in the north end zone. Removal of loge structure in the southwest corner and demolition of the upper deck of the northeast end zone. Phase 2: work on east and north sides. Phase 3: work on the west side and on the Student Athletics Facility. Work includes connecting the main concourse with the south end zone. Premium seating will be added, along with expanded restrooms. Infrastructure improvements to water, electrical and mechanical systems. Architect: Gould Evans and HNTB. Construction: Hunt/Sundt Construction. Finance: real estate project University Athletics Facilities District.

Cost US\$300m

Completion 2019

AZ, Phoenix: Phoenix Rising Stadium



Phoenix Rising Football Club has picked Populous and Gould Evans to design its proposed Major League Soccer (MLS) stadium. The pair will collaborate to create the newest professional sports stadium in the greater Phoenix area. Phoenix Rising FC is the highest-level professional soccer franchise in Arizona's history. The club is owned by legendary Chelsea and Ivory Coast striker Didier Drogba, Kona Grill CEO Berke Bakay and an impressive collection of business leaders and international celebrities.

AZ, Tucson: Arizona Stadium

Proposed makeover of Arizona Stadium as part of campus-wide 2017-19 Capital Improvement Plan. Seeking student and other stakeholder input while researching requirements. Replace dated restrooms, concessions facilities and about 50,000 bench seats. Arizona Wildcats (athletic director Greg Byrne). Also seeking to build an indoor training facility.

Capacity 50,000 (56,000)

Cost US\$146m

CA, Fresno: Bulldog Stadium



Renovation plans for Bulldog Stadium that will transcend the 35-year-old facility into a new era for Fresno State Athletics (Director of Athletics Jim Bartko). Improve all amenities, enhance the fan experience. Access tunnels built into the berm and a cross-sectional concourse at the midpoint of the bowl, doubling of restrooms and concessions, extra suites, club seats, loge areas, sponsorship displays and the possibility of naming rights, new press box and a new two-story football facility in the south end zone with a HD video board on top + ribbon boards. Phased construction. Architect: AECOM Sports.

Completion 2019

CA, Indian Wells Tennis Garden: Stadium 3

Proposed stadium to include a tennis museum that would be open to the public 10 months a year.

Capacity 4,000-5,000

Completion 2017



CA, Los Angeles: Inglewood NFL Stadium


The new home of the Los Angeles Rams and Chargers is beginning to take shape. Construction was held up last year because of an unusually wet winter, meaning the opening date for the \$2.6 billion stadium was pushed back to 2020. For the Rams (owner Stan Kroenke) and NFL west coast operations on the former site of Hollywood Park racetrack and casino. NFL owners overwhelmingly voted for the St Louis Rams to relocate to Los Angeles. San Diego Chargers and Oakland Raiders could end up taking a stadium-share option if they can't resolve own stadium issues (NFL US\$100m subsidy to remain in their current home markets). Outdoor feel under a canopy covering 19 acres with all sides of the building open-air, allowing natural breezes to pass through the venue. Site area: 3.1m ft². Height: 175ft. Roof: transparent ETFE canopy (19 acres). Developers: Stockbridge Capital Group (Terry Fancher). City of Champions Revitalization. Project to develop 300 acres for shopping mall, office, hotel, residential, entertainment/performance venue and a NFL stadium. Integration into LA County a priority to create destination. Project manager: Legends Project Development. Infrastructure management: Wilson Meany. Architect: HKS. Construction: Turner and Hunt Construction.

Capacity	70,000 (70K fixed, expandable to 80K)
Cost	US\$2.5bn
Completion	August 2020

CA, Los Angeles: Banc of California Stadium

Doors have opened for the new home of Major League Soccer's Los Angeles Football Club (LAFC). In addition to a soccer field, the \$350 million stadium houses shops, a multitude of food options, and conference space. The 22,000-seat, Gensler-designed stadium has been under construction since 2016 and has been built on a site previously occupied by the Los Angeles Memorial Sports Arena in Exposition Park for the newest MLS team. ETFE roof for shade and to retain fan noise. Jobs: 3,000. Area: 100,000ft². Annual economic activity: \$129m. Construction: PCL Construction. Architect: Gensler.

Capacity	22,000
Cost	US\$350m
Completion	March 2018
Mechanical Engineer	ME Engineers
ME is providing full MEP design.	

CA, Los Angeles: LAFC Training Centre


The Los Angeles Football Club (LAFC) has officially opened its brand new, 30,000ft² Performance Facility on the campus of Cal State LA. The facility is the new home to the club's MLS players, staff, coaches and LAFC Academy. Gensler Sports and AECOM Hunt served as the design build team on the innovative project, with Legends acting as the project manager. The new training site and practice facility features a natural grass practice field exactly mirroring that of Banc of California Stadium, locker rooms, sports medicine facilities, office space for LAFC coaches and staff and will be completely financed by LAFC. Architect: Gensler.

Cost	US\$30m
Completion	2017

CA, Oakland: Oakland A's ballpark

The Oakland Athletics have hired four world-class design firms – Sasaki, Snøhetta, Studio T-Square, and HOK – to lead the design process for the club's new Oakland ballpark at the Peralta site. Sasaki, Snøhetta, and Oakland-based Studio T-Square will lead master planning and urban design efforts, and will assist the A's in a robust community engagement process. HOK and Snøhetta will collaborate on design of the new ballpark and its interface with the master plan.

Capacity	32,000-36,000
Cost	US\$300-\$400m

CA: Sacramento Republic FC Stadium

Ground-making carried out at soccer specific stadium for franchise with MLS ambitions. This phase one of the project will set the stage for the "groundbreaking," which is inked in for spring 2018 with actual construction of the facility. The stadium plan is projected to cost \$245 million, privately financed, with initial capacity for 20,000, to expand to 22,000. Planning commission approval given, council vote imminent. Suites: 36. Party suites: 3. Premium seats: 3,100. Standing: 500. Development requires spot in MLS. Architect: HNTB.

Capacity	22,000
Cost	US\$245m
Completion	2020

CA, San Diego: San Diego State University

SDSU has unveiled more details of plans for a multi-use stadium in Mission Valley. SDSU Athletic Director John David Wicker said the proposed 35,000-seat stadium at the site could morph into a 55,000-seat facility that could serve as a future home of a San Diego National Football League (NFL) franchise. By working with Populous and JMI Sports from the outset, SDSU's proposed Mission Valley stadium would offer a future San Diego NFL owner the opportunity to partner on a state-of-the-art professional football stadium in the centre of San Diego. Regardless of when an NFL franchise returns to San Diego in the future, a professional football tenant would also be able to utilise the west side of the proposed SDSU multi-use stadium that would result in a significant savings to construction costs. The stadium interior would feature more than 82 suites, including field level, lower bowl sideline and upper sidelines, five different club sections (totalling approximately 6,500 seats), 50 loge boxes with lounge access, two end zone party decks and six exterior balconies, providing fans in San Diego unparalleled methods to enjoy games, concerts and a wide variety of events.

Capacity	32,000
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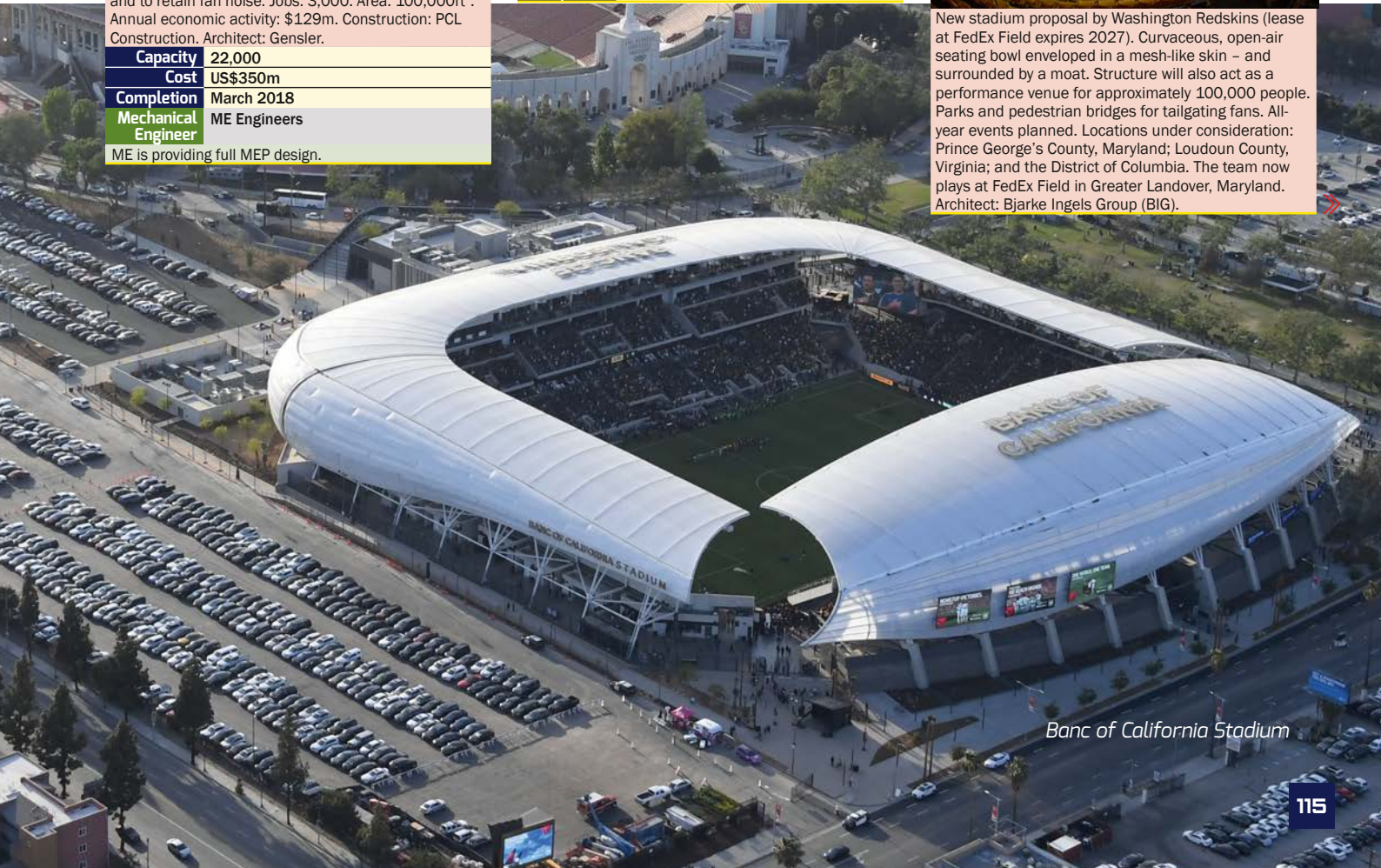
CA, San Diego: Saddleback College Stadium

Replaces campus's existing stadium. Press box, restrooms, scoreboard, synthetic turf, and a nine-lane running track, improvements to the athletic practice fields for football and soccer and new surface parking lot. Design and build: PCL Construction Services

Capacity	8,000
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DC, Washington Football Stadium


New stadium proposal by Washington Redskins (lease at FedEx Field expires 2027). Curvaceous, open-air seating bowl enveloped in a mesh-like skin – and surrounded by a moat. Structure will also act as a performance venue for approximately 100,000 people. Parks and pedestrian bridges for tailgating fans. All-year events planned. Locations under consideration: Prince George's County, Maryland; Loudoun County, Virginia; and the District of Columbia. The team now plays at FedEx Field in Greater Landover, Maryland. Architect: Bjarke Ingels Group (BIG).



Banc of California Stadium

**DC, Washington: DC United's Audi Field**

Major League Soccer team DC United is to receive a \$25 million private clean energy funding package for installation of state-of-the-art energy and water efficiency measures at its new Audi Field stadium. Measures include an 884 KW solar array and stormwater retention systems. The measures are funded through the Department of Energy and Environment's (DOEE) Property Assessed Clean Energy (DC PACE) programme, DC's innovative green funding solution which operates through a public-private-partnership, allowing local lenders to fund environmentally beneficial projects at no cost to taxpayers. Ground broken in Feb 2017 on new 'contemporary industrial' style stadium. Lead project amongst infrastructure improvements for Buzzard Point waterfront district. Public private partnership (30 years). The state-of-the-art urban facility has a capacity of 20,000 fans and will feature 31 luxury suites, a bike valet, and 500,000ft² of mixed-use retail and residential space on site. MLS team has been looking for a number of years. Land acquisition: \$89m. Area: 331,000m². Entrance northeast corner, team store on north side, locker rooms in two-storey secondary structure on the south side. Bicycles: 230. Most fans will arrive by public transport. Finance: half team, half city. Complex land deal. Suites: 32. Architect: Populous. Associate: Marshall Moya Design. Construction: Turner Construction.

Mechanical Engineer ME Engineers

ME is providing full MEP, technology, and sports lighting design services as a joint venture with JVP Engineers.

Capacity 19,000

Cost US\$300m

Completion Q2 2018

FL, Gainesville: University of Florida

The University of Florida Athletic Department has announced plans to build a new baseball park, a new \$65m stand-alone football training complex (Architect: HOK) and carry out upgrades to its current softball stadium. The projects, which combined are estimated to cost \$130 million, are part of phases 2 and 3 of the University Athletic Association's (UAA) Facilities Master Plan. Construction for the estimated \$50 million baseball ballpark, with an overall capacity of 10,000, will begin in the fall of 2018 with a completion goal prior to the 2020 season. Home plate will face northeast with the sun behind the stadium for a cooler atmosphere for the student-athletes and fans. A 360-degree open concourse will give fans constant field views and multiple seating options will be under shade. Permanent chairback seats will increase from 2,408 to approximately 5,000, while fans will also be able to choose from premium seating and non-traditional seating options to bring overall capacity to approximately 10,000. Architects and Engineering – Populous and Walker Architects.

Cost US\$50m

FL, Jacksonville: EverBank Field

Renovation for Jacksonville Jaguars (President Mark Lamping). Includes addition of a 5,000 seat amphitheater and renovations to the stadium's clubs.

Mechanical Engineer ME Engineers

ME is providing full MEP and technology design.

Cost US\$37m

FL, Miami MLS Soccer Stadium

Miami Beckham United has bought a three-acre parcel of land in Miami's Overtown neighbourhood off the Miami River, giving Beckham's group a total of nine acres for the purpose of building a privately-financed, 25,000-seat downtown soccer stadium in its pursuit of an MLS expansion team. The group is still awaiting the result of a lawsuit appeal for the final parcel of land that will complete the site. The group has won an MLS franchise in Miami. Close to transport and River District. Developer: David Beckham group (Beckham exercising option on MLS franchise, Simon Fuller). Finance: private. Architects: Arquitectonica (Principal Bernardo Fort-Brescia) and HOK.

FL, Sarasota, Braves Spring Training Ballpark

Construction underway on Spring training facility in North Port, Sarasota for Atlanta Braves. Six-field training complex with two half-size pitches. Team's lease at Champion Stadium in Disney World ends in 2017. The 9,000 capacity facility is slated to open in 2019 and would have 6,500 seats with room for a further 2,500 on benches or standing. The venue would include a number of suites, along with six full and two half practice fields, a player academy, training spaces and clubhouses.

Capacity 9,000

Cost US\$80m

Completion 2019

FL, St. Petersburg: Al Lang Stadium

The Tampa Bay Rowdies have taken a major step towards bringing a Major League Soccer (MLS) franchise to Tampa Bay after St. Petersburg voters approved expansion of the Al Lang Stadium. The vote now means the City Council has the authority to negotiate a long-term use agreement for Al Lang Stadium.

FL, St. Petersburg: Carillon Ballpark

Rays seeking new stadium site with council approval. Hillborough County in the running. Carillon proposed by developer CityScape (Darryl LeClair) for Tampa Bay Rays. Club noncommittal. Offices as part of stadium structure. Part of retail and residential development. Retractable or fixed transparent roof options. ETFE roof and wall. Consultants: HKS and Hunt Construction.

Capacity 35,000

Cost US\$577m (retractable), US\$548m (fixed)

FL, Tampa: Raymond James Stadium

Tampa Bay Buccaneers have announced the next phase in the more than \$150 million renovation of Raymond James Stadium. The latest enhancements are highlighted by a completely redesigned West Stadium Club, a new team retail store, expansion of the highly successful Hall of Fame Club, and a new home team locker room. The redesigned West Stadium Club will incorporate modern style with high-end finishes and furnishings, while providing more than 60,000ft² of total lounge space – an increase of more than 25% from the original event space.

FL, Tampa: Tampa Bay Rays Stadium

Major League Baseball's Tampa Bay Rays have announced a site for their proposed new ballpark. The Rays have selected a site in Ybor City in Tampa, which is the centre of Tampa's historic cigar industry. The stadium site covers 14 acres and it contained by Channelside Drive to the west, 4th Avenue to the north, 15th Street to the east, and Adamo Drive to the south. The team currently plays at Tropicana Field, which is located across Tampa Bay in St. Petersburg.

GA, Athens: Sanford Stadium

The University of Georgia has approved major enhancements to the west end zone of its Sanford Stadium. The renovations will encompass 120,000ft² of new and improved space that will include a new locker room for the Bulldogs, room to host and entertain prospects on game day, a larger video board and a new plaza for game day fans. The construction project is expected to take approximately 17 months to complete. In order for the enhancements to be ready for the 2018 football season, initial work needs to begin by April 2017..

Cost US\$63m

Completion 2018

GA, Atlanta: Bobby Dodd Stadium

Georgia Tech athletics has announced a series of comprehensive fan experience enhancements. The planned enhancements are aimed at improving all aspects of the gameday experience for fans attending Georgia Tech football games at Bobby Dodd Stadium. Located in the heart of Georgia Tech's Midtown Atlanta campus, Bobby Dodd Stadium was constructed in 1913 and is the oldest stadium in NCAA Division I FBS. It has not undergone major renovations since the construction of the stadium's north end zone structure in 2003, which added 15,000-plus seats and 10 luxury suites to the historic facility. Among the items being planned for implementation by 2023: improvement and enhancement of existing premium seating areas; creation of additional premium seating areas; improved cellular and Wi-Fi connectivity; enhanced stadium audio; improved general seating options; expanded tailgate offerings.

Completion 2023

GA, Statesboro: South Georgia Tormenta

South Georgia Tormenta FC are looking at building a soccer-specific stadium in Statesboro, Georgia. Tormenta FC Owner and President Darin Van Tassell revealed intentions to explore the possibilities of a move from the Premier Development League – the top amateur league in North America – to the USL's Division III in May. Since then, Van Tassell has been busy expanding the club's ownership group and researching plans for a new stadium should Tormenta FC join the third-division league.

Capacity 5,000

IA, Iowa City: Kinnick Stadium

Improvements to north stands at the University of Iowa. Athletics Director: Gary Barta. New suites, restroom upgrades and expanded food options in the north end zone – not been upgraded since 1983. Planning addressing logistics challenges ahead of design. Finance: city, university.

Cost US\$75m

IL, Champaign: Memorial Stadium

University of Illinois continuing Illinois Renaissance project to renovate Memorial Stadium with priority given to the south horseshoe and the east side of the stadium. Director of Athletics Josh Whitman. Finance: donations and Department of Intercollegiate Athletics money. Phase one: reconfiguration of the south end zone will include construction of a new home for all football operations including locker rooms, training, recovery, sports medicine, meeting and office space, coaches offices, equipment room, recruiting venues, a grand entrance and a student-athlete dining space. Request for Proposal for architectural services issued. Second phase: east grandstand lower and upper levels – new restrooms, concessions, elevators, enhanced fan accessibility and ADA seating (end 2020 season).

Capacity 60,000

Cost US\$132m (\$95m phase one)

Completion 2019 (phase one)



IL, Chicago: Chicago Bears Halas Hall

The Chicago Bears have partnered with global design and architecture firm HOK to design a 162,500ft² extension to their training facilities. The building work will add to the already existing 143,000-square-foot Halas Hall facility and a 30,600ft² remodeling project on the northeast side of the building. The addition will feature a 13,000ft² indoor turf space for training and walkthroughs with a 133ftx26ft video projection wall and adjacent virtual reality room, in addition to a weight room expanded by 2,000ft². Also included will be an equipment room, recovery space and nutrition/fuel station that are double the current size. Additionally, the sports medicine space will be four times larger than the present area and will feature a hydrotherapy pool.

IL, Chicago: Wrigley Field

Cubs to upgrade player facilities, add a big screen in left field and an ad screen in right field. Main screen: 5,700ft². Hotel development across street but no connecting bridge. City council approval gained as first step in getting full planning permission. Four phases to upgrade club houses, concourses, suites and retail. Architect: VOA Associates. Consulting architect: DAHQ Architects and Harboe Architects. Contractor: Pepper Construction. Owners' rep: ICON Venue Group., Structural engineer: Thornton Tomasetti. Steel: David Architectural Metals, Lenex Steel and Byus Fabricators. ME: ESD. AV consultant: WJHW. F&B: Levy Restaurants.

Mechanical Engineer ME Engineers

ME is providing MEP and lighting design.

Capacity 42,495

Cost US\$575m

Completion 2020

IL, Woodstock: Lakewood Sportsplex

Proposed minor league ballpark for McHenry County K-Nines. City providing land for a stadium. Finance: Private investors now sought. Developer: Equity One Sports Development.

Cost US\$40m

IN, Bloomington: Indiana University

A new volleyball/wrestling indoor arena to be built on the Bloomington campus for Indiana University. Will allow the volleyball and wrestling teams to move from their current locations to the athletics campus. The 2,500- to 3,000-seat venue will be used as a competition facility for both volleyball and wrestling, as well as the practice facility for volleyball.

IN, Indianapolis Motor Speedway

Proposed new grandstands and possibility of floodlighting. Seeking public funding.

Cost US\$100m

IN, Indianapolis Soccer Stadium

Proposed soccer stadium for Indy Eleven. Multipurpose ambitions. Team seeks tax dollar help in the form of bonds paid for by an event tax. Proposal going to vote in senate. Currently plays at Carroll Stadium at IUPUI.

Capacity 18,500

Cost US\$87m

KS, Lawrence: Memorial Stadium

Proposed renovation of Memorial Stadium for Jayhawks' football. Consulting: HNTB. Track can be removed after building of \$39m complex in west Lawrence for soccer, softball and track and field.

KY, Papa John's Cardinal Stadium

University of Louisville Athletic Department (athletic director Tom Jurich) has begun fundraising to add 10,000 seats to the north end of the stadium. The Howard Schnellenberger Football Complex will also undergo major renovations. Doubling of size of team's weight room and conditioning centre. Improved players and coaches facilities. Club seats: 1,000. Premium boxes: 70. Field level suites: 12. Finance: PepsiCo \$5m, Planet Fitness \$3m.

Capacity 65,000 (55,000)

Cost US\$55m

Completion 2019

KY, Lexington: University of Kentucky Ballpark

Ground has been broken on the construction of the new baseball stadium. Construction is expected to take 18-20 months, meaning the stadium will open in late autumn 2018 in time for the 2019 UK baseball season. Final approval for the project was given by the UK Board of Trustees in October, continuing the ongoing \$2.2 billion transformation of the University of Kentucky campus. Stadium being built next to Kentucky's football stadium. For Southeastern Conference Wildcats (athletic director Mitch Barnhart). Suites and a club area. Ability to add temporary facilities to host 6,000 for big tournaments. Parking: 1,200. Architects: Ross Tarrant Architects and HNTB.

Capacity 4,000 (2,400 seats)

Cost US\$49m

Completion fall 2018

KY, Louisville Soccer Stadium

Louisville City FC has moved a step closer to building its own 10,000 seat, soccer-specific stadium after taking an option on land in the Butchertown neighbourhood. Lou City has entered into a partnership with architects HOK for the design of a soccer-specific stadium. HOK will design a 10,000-seat stadium that could later expand in capacity to 20,000. The overall site plan will also include space for office and retail development. Louisville City currently plays at Louisville Slugger Field (6,500 crowd). Study: Conventions, Sports & Leisure Int (\$75,000).

Capacity 10,000 (expandable to 20,000)

LA, Lafayette: UoL Ballpark

Renovation for University of Louisiana M.L. "Tigue" Moore Field. Athletic director: Scott Farmer. Architect: Abell + Crozier + Davis, DLR Group. Also on campus: new sports plaza behind the south end of Cajun Field, renovation of the Academic Center, proposed improvements at Earl K. Long Gym and the Culotta Tennis Center and a new basketball practice facility.

Cost \$10m

MA, Boston: New England Revolution Stadium

Proposed new soccer-specific stadium at the site of the former Bayside Expo Center. Vice president of construction and development for the Kraft Group: Ted Fire.

MA, Cambridge: Harvard Stadium

Renovation of and addition to the Harvard Stadium over the next two years. Repairs, increase accessibility, expand and upgrade stadium's restroom and concession facilities. New locker room spaces, press areas, indoor seating, and office space. Decreased capacity by approx. 8,000.

Capacity 22,000 (30,262)

Completion 2018

MA, Malden Ballpark

Proposed ballpark for minor league team (Atlantic League). Developer purchasing land parcels. Artificial turf and winter bubble to cap the surface and for community use in off-season. Developer: Boston Field of Dreams (Alexander Bok). Preconstruction: Turner Construction.

Capacity 6,000

Cost US\$30-\$35m

Completion April 2017

MD, Baltimore: M&T Bank Stadium

NFL's Baltimore Ravens three-year programme to enhance the fan experience at M&T Bank Stadium. Improvements include new 4K ultra-high definition video displays, escalators and elevators to the upper deck, a new sound system and upgraded kitchen facilities. Another improvement will be the addition of new LED ribbon displays, which will be installed around the seating bowl's suite level. In total, the Ravens will be installing more than 28,000 square feet of video displays. The Maryland Stadium Authority has also agreed to contribute an additional \$24m – designated for general stadium upkeep – bringing a \$144 million in combined funds that will improve the stadium over the next several years.

Cost US\$120m

MD, Baltimore: UMBC Event Center

The University of Maryland Baltimore County (UMBC) Event Center has opened for action. It is a comprehensive, all-in-one athletics venue designed as one of the premier mid-major NCAA Division 1 facilities in the US. The arena will be home to the UMBC Retrievers M&W basketball programs and women's volleyball team.

Flexible and multi-purpose in nature, the event centre has seating capacity for 5,000 in its stadium bowl and an additional 1,000 on the floor. The arena will be used for commencement, concerts and various public speaker events and is equipped with concessions, catering, hospitality, restrooms and security and guest services amenities.

Capacity 6,000

Cost \$85m

MD, Baltimore Soccer Stadium

Maryland Stadium Authority investigating market for a MLS team with feasibility study (\$100,000). 42-acre waterfront site identified.

Capacity 17,000-20,000

MI, Detroit: Ford Field

NFL's Detroit Lions have unveiled a design renovation plan of Ford Field's hospitality areas. The renovations are part of a larger \$100 million upgrade project which includes a larger scoreboard, technology upgrades and architectural renovation. A total of 210,000ft² of premium space, ranging from large social clubs to suites and loges, will be renovated in place or completely reconfigured. ROSSETTI, which is headquartered in Detroit, is the design architect for the renovation and was also the original designer of the stadium, which opened in 2002.

Cost US\$44m

MI, Detroit: MLS Stadium and District

Proposed soccer stadium to establish MLS in Detroit as cornerstone of larger development at Wayne County's unfinished jail site. Early discussions under way. Restaurants, retail, fitness, spa and conference centre. Also 30-storey hotel/residential tower, 24-storey residential tower, 18-storey office tower and 12-storey office tower. Podium open to the public at all levels from the ground up to the park-like setting along the rooftop nature trail, an 8-10 block continuous elevated greenspace that connects all four towers. Area: 15 acres. Parking: 5,400. Developer: investor partner group spearheaded by Tom Gores (Detroit Pistons owner) and Dan Gilbert (Cleveland Cavaliers' owner). Architect: ROSSETTI (Matt Rossetti, Dan Soleski, Nick Moriarty, John Bigtacion, Joe Donelko).

Capacity 20,000-25,000

Cost US\$1bn (overall project)

MI, Central Michigan University

Populous has been picked to take the lead in designing the Chippewa Champions Center at Central Michigan University's Kelly/Shorts Stadium. Populous will partner with GMB, the architectural firm that designed CMU's soccer and lacrosse stadium. Meeting spaces, an alumni centre and offices housing the CMU Advancement team are included in the plan. The Chippewa Champions Center will replace the current locker room building in the north end zone of Kelly/Shorts Stadium.

The current vision includes a new football locker room, a rehabilitation centre and a nutrition centre for all 475 CMU student-athletes, team meeting space and offices for football staff and a weight room.



**MI: Rosemont Ballpark**

Minor league baseball stadium for team in the American Association of Independent Professional Baseball on 10 acres of village-owned land north of Balmoral Avenue and west of the Tri-State Tollway. Four-level parking garage (+\$20m). One-level stadium with skyboxes, party decks and club areas. Finance: Village. Architect: AECOM Services (\$2.6m).

Capacity	6,300
Cost	US\$35m
Completion	2018

MI: St. Louis: St. Louis Soccer Stadium

Proposed MLS stadium on 13-acre plot located at the intersections of Grand Boulevard and Chouteau Avenue, owned by St. Louis University. Tenants: MLS expansion team, women's soccer team, SLU's men's and women's soccer teams. Two groups are bidding to provide an expansion team in the city.

Capacity	22,500
Cost	\$135m-150m

MN, Eagan: Twin Cities Orthopedics Performance Center and TCO Stadium

Team base and practice facility for the Minnesota Vikings. Area: 40 acres. Outdoor stadium (natural turf) and four additional outdoor practice fields – three grass, one synthetic; outdoor training areas, including a sand pit and inclined surfaces; an indoor practice facility with a 100-yard synthetic surface field and full-clear height for kicking; a team auditorium and player position meeting rooms; media center/press facilities; expanded locker room, weight room and equipment facilities; cardiovascular and specialized speed rooms; and a hydrotherapy room and post-workout recovery rooms. Naming partner: Twin Cities Orthopedics (TCO). Architect: Crawford Architects. Construction: Kraus-Anderson Construction Company.

Capacity	6,000
Completion	March 2018

MN, Minneapolis: University Athletics Village

University of Minnesota Center for Excellence, which will house academic, leadership and nutrition centers, a Football Performance Center, Football Indoor Practice Facility and a Basketball Development Center. Finance: private (US\$70m). Architect: BWBR Architects. Director of athletics: Norwood Teague. Area: 340,000ft². Construction: Mortenson.

Cost	US\$190m
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MN, Saint Paul: Allianz Field

Work well underway on new home for Minnesota United. Stadium to be known as Allianz Field. Roofed stadium at the Snelling-Midway site. Privately financed, publicly owned. Safe standing area for fans (2,900). Variety of corporate spaces and seating options. Clubs: 3. Green: LED lighting throughout. Pitch: natural (heated). PTFE building skin, native materials in exterior finish. Retail: 1,600ft². Architect: Populous.

Capacity	20,000
Cost	US\$150m (\$120m)
Completion	2019
Mechanical Engineer	ME Engineers

ME is providing full MEP design.

MO, Columbia: Mizzou Softball Stadium

University of Missouri's new softball stadium located east of the Hearn Center. To host the 2018 Southeastern Conference Tournament. Full-view concourse and outfield plaza.

Capacity	2,700 (1,700 seated)
Completion	2017
Mechanical Engineer	ME Engineers

ME is providing full MEP design.

MS, Jackson: JSU Dome

For Jackson State University to host football and basketball games, as well as concerts on campus. Sports Hall of Fame on first floor. Parking: 4,500. Finance: up to \$75m state-issued bonds.

Capacity	50,000
Cost	US\$200m

MS, Oxford: Swayze Field

Upgrade to improve fan experience at home of Rebels, Ole Miss Baseball (Director of Athletics Ross Bjork). New baseball performance center, a field level club, additional box seating, a rooftop plaza down the first base line and an expansion/realignment of the left field terrace. Part of the \$200 million Forward Together campaign.

Capacity	10,715 (10,323)
Cost	US\$13m
Completion	2018

MS, Oxford: Vaught-Hemingway Stadium

Enclosure of north end zone and adding suites (30) and skyboxes on the south and west sides. Athletic department (Assistant Athletic Director Kyle Campbell) authorised by The University of Mississippi's College Board to hire AECOM Technology Corp. for \$2.4 million to design the expansion. Finance: donations to Ole Miss' Forward Together athletics fundraising campaign. The university is also building a new basketball arena and plans to pay for the stadium expansion from the same campaign.

MS, Starkville: Polk-Dement Stadium

A complete overhaul of Mississippi State University's (MSU) Dudy Noble Field-Polk DeMent baseball stadium can push ahead after a funding deal was agreed. Trustees have approved plans for MSU to borrow up to \$30 million to expand and upgrade the stadium. The Dudy Noble Field Master Plan calls for a new double-tiered grandstand, welcoming entry plazas, restrooms, concessions, a kids' play area, berm seating and upgraded field lighting. Design team: Wier Boerner Allin Architecture, Populous, Janet Marie Smith. Finance: \$25m donations, \$30m loans. Skyboxes: 25. Left Field Lofts: 1,000ft² apartments behind Left Field Lounge: 25. Left Field Lounge will have also have a walkway through the middle where those who do not know lounge owners can walk through and not block anyone's view. New locker rooms, training rooms, equipment rooms and potentially coaches' offices. Two main entrances: one behind home plate and one in right field with a large entry plaza. Additional and bigger concession areas and restrooms, both in the grandstand and outfield. HD video board, ribbon boards and field lighting.

Mechanical Engineer	ME Engineers
ME is providing MEP and Technology design.	
Cost	US\$55m

NC, Charlotte: American Memorial Stadium

Renovations to house the Charlotte Independence pro soccer team and school and amateur sports. Club seating, concourse and concession renovations, synthetic turf field. Finance: private, county (\$8m), city (\$8m) and tourism. Team currently play in temporary 4,300-seat facility at Charlotte's Randlewood Soccer Complex (Nussli Group).

Capacity	14,000
Cost	US\$25m
Completion	2017

NC, Fayetteville Ballpark

Minor league baseball stadium in downtown behind the Prince Charles Hotel. Hotel part of development and investment group. City dealing exclusively with the Houston Astros, which would like to relocate a Class A-Advanced ball club from California to play in the Carolina League by 2018. City refining site plan and design.

Capacity	5,000
Cost	US\$30m-\$40m
Completion	2018-19

NC, Greenville: Dowdy-Ficklen Stadium

Renovation for East Carolina. Southside tower. Premium seats: +1,000, club level, suites and a new press facilities. Improvements to Ward Sports Medicine Building and Scales Field House to increase space for student-athletes. New nearby hitting facility for baseball and softball.

Cost	US\$55m
Completion	2018

NC, Raleigh: North Carolina FC Stadium

MLS hopeful, North Carolina Football Club, has chosen its preferred location to build a new stadium and entertainment complex in Raleigh. In partnership with Kane Realty, the community hub will include conference space, office, hospitality and retail space, housing and public parking. The project's footprint is approximately 13 acres in the area currently known as the State Government Complex, located within the boundaries of Peace St., Salisbury St., Lane St. and the CSX Rail easement. Architect: Gensler.

NJ, Monmouth County: Kessler Field

A four-storey building behind the Monmouth stadium stands is planned. Restrooms, concession stands, Press box, scoreboard operations, broadcast booth and many other media uses. Finance: \$11.25 private. Donors still required. Athletic Director Marilyn McNeil. Construction will start once funds are acquired.

Capacity	4,200
Cost	US\$15m
Completion	2017

NM, Portales: ENMU Football Stadium

Proposed replacement for 45-year old stadium. Funding: student vote on fee increase. Also for schools use and with City Manager's support.

Cost	US\$18m
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NV, Las Vegas: Las Vegas Motor Speedway

Las Vegas Motor Speedway (LVMS) to undergo series of improvements. The speedway is making a number of enhancements to the seating and viewing areas for 2018 in an effort to improve and diversify its fan experience. The renovations, designed by the Detroit-based architectural firm ROSSETTI, will modernise and transform LVMS's fan experience. Enhancements include three completely renovated, exclusive clubhouse areas; the new Turn One Social Pavilion; two separate loge-box seat offerings; and a racing-inspired, interactive sports lounge..

Completion March 2018

NV, Las Vegas: Football Stadium

A groundbreaking ceremony has taken place at the home of the NFL Raiders' Las Vegas stadium. The event kicked off the construction of the 65,000-seat domed stadium that will serve as the team's new home. NFL owners approved the Raiders' relocation from Oakland in March, with 31 of the 32 owners voting in favour of the move.

Capacity	65,000
Cost	US\$1.2bn-\$2.1bn

NV, Las Vegas: University of Nevada Stadium

UNLV is a possible partner in football stadium construction. Previously looked at funding of an on-campus stadium (deal with Majestic fell through.) Consultant: Conventions Sports & Leisure International (\$325,000).

Capacity	60,000
Cost	US\$500m (stadium) US\$2bn (overall)

NV, Summerlin: Las Vegas Ballpark

The Howard Hughes Corporation has unveiled plans to develop and construct a baseball stadium in Downtown Summerlin for the Las Vegas 51s. Stadium to be built on approximately eight acres just south of City National Arena, the National Hockey League practice facility for the Vegas Golden Knights. The Las Vegas Ballpark is being designed by HOK. The 10,000-fan-capacity stadium blends the distinct architectural style of the Summerlin community with the aviation legacy of Howard Hughes. The ballpark will provide a wide range of seating options including 22 suites, club seats, berm seating, party zones and decks, picnic tables, kids' zone, bars and a pool beyond the outfield wall.

Completion 2019

NY, New York: NTC Flushing Meadows

A second roofed court will make its debut at the US Open at Flushing Meadows in New York in August 2018.

The new Louis Armstrong court has a retractable roof and is the final phase of a five-year, \$600 million project that rebuilt the USTA Billie Jean King National Tennis Center. It will be the first naturally ventilated stadium of its kind with a retractable roof, with openings at the north and south ends allowing air to flow through even when the roof is closed. The new court has 14,000 seats. Part of Multi-year 'Sports Spectacle' project to redevelop the Billie Jean King National Tennis Center (NTC). Phase one completed: retractable roof on Arthur Ashe Stadium, Grandstand Stadium and South Tournament Courts renewed. Architect: ROSSETTI. Construction: Hunt. Developer: USTA.

Mechanical Engineer ME Engineers

ME provided MEP design for the roof addition.

Capacity +10,000

Cost US\$550m

Completion 2018

NY, New York: Queens Soccer Stadium

New York City FC playing in Yankee Stadium while seeking to build a soccer-specific stadium in Queens or or Brooklyn. MLS Commissioner Don Garber has presented plans to build a 25,000-seat stadium at Flushing Meadows Corona Park. Designed to allow upgrade to 35,000. The plans call for parkland used for the project to be replaced acre-for-acre. Jobs: 150 full-time, 700 part-time.

Capacity 25,000

NY, Elmont: Belmont Park Soccer Stadium

A proposed plan to the Empire State Development Corporation for a soccer stadium in the underused Belmont Park. Tenant team: New York Cosmos. Included in the proposal are plans for 9 new restaurants, 250,000 square feet of retail space and a 4.3-acre park. Construction jobs: 500. Full-time jobs: 3,000. Expected \$200m annual revenue after build.

Capacity 25,000

Cost US\$400m (privately funded)

Completion 2017

NY, Syracuse: University Stadium

Syracuse University is to spend \$118 million on revamping its stadium over the next few years. Upgrades include a new fixed roof, a vertically hung scoreboard, state-of-the-art sound and lighting systems, improved accessibility and added Wi-Fi capabilities. The investment, authorised by the Board of Trustees, will enable the University to create a new stadium experience for students, faculty, staff, alumni and fans alike. The stadium upgrades represent the next step in advancing the \$255 million West Campus transformation strategy the University first announced in 2016. Consultant: Irwin Raij.

Cost US\$118m

OK, Oklahoma University softball/baseball

The University of Oklahoma (OU) has completed the drafting of master plans for the baseball and softball facilities at OU. The work encompasses expansion and enhancements at both L. Dale Mitchell Park and the OU Softball Complex. Populous, the firm retained for the south end zone project at Gaylord Family - Oklahoma Memorial Stadium, has performed the work on the two ballparks. The full master plan calls for approximately \$15 million of work at the softball park and \$10 million at the baseball park. The work could be phased if necessary.

OH, Akron: MLS Stadium

Proposed retail village and retractable-roof stadium for MLS expansion team. Developer: Wolstein Sports & Entertainment Group LLC (Paul Garofolo). Finance: \$7m per year tobacco tax, Wolstein \$100m.

Capacity 20,000-25,000

Cost US\$327m (stadium \$110m-\$165m)

OH, Canton: Tom Benson Hall of Fame Stadium

Hosts Hall of Fame game. First phase connected stadium to HOF and added specialist features. Next phase: premium environments with suites, clubs and club seats; technology integration; roof terraces; fan concourses and amenities; and NFL standards throughout. HKS is also designing and creating an expanded destination environment for the Hall of Fame Village. With the Hall as its nucleus and a new stadium to accommodate additional sports and entertainment events, the masterplan envisions the site as a national destination and a regional asset that provides local connectivity to the Canton community. Architect: HKS Sports & Entertainment Group.

Completion August 2017

OH, Cincinnati: FC Cincinnati Stadium

FC Cincinnati has released renderings for their proposed Dan Meis designed soccer-specific stadium. The design features a canopy on all four sides and a façade that can be illuminated with LED lights reflected off translucent material. The 25,000-seat, horseshoe-shaped concept has been inspired by Bayern Munich's Allianz Arena. The stadium is expandable to 30,000 seats when berm seating is added to one end of the closed-in horseshoe. FC Cincinnati does not yet have a site secured for their proposed \$200 million stadium, which they are seeking to fund through a public-private partnership. The USL club currently plays at the University of Cincinnati's Nippert Stadium and is currently considering three sites: one in Cincinnati's West End neighbourhood, another in the city's Oakley neighbourhood and a third just across the Ohio River from downtown in Newport, Kentucky.

Cost US\$200m

OH, Columbus: Ohio Stadium

Four-year renovation project for Ohio State University's iconic home (1922). Restore and re-coat the 94-year old concrete on C-deck, upgrade power distribution systems for the east, west and south stands, improve and upgrade B-deck to include better lighting, larger televisions, an improved sound system and better scoreboards, renovate the premium seating area to consolidate the university suites into one University Suite and add 35 loge boxes and 12 luxury suites. Finance: Department of Athletics using auxiliary funds, debt and private donations. Design and build process autumn/fall 2016, C-deck concrete restoration 2017-2020, University Suite expansion completed in August 2017, removal of 2,600 seats 2018, suites and loge seats completed in 2019.

Capacity 102,854 (104,944)

Cost US\$42m

Completion 2020

OR, Eugene: University of Oregon

The University of Oregon has unveiled plans to build a futuristic new track and field stadium. The University said Hayward Field will set a new standard for sports venues, create world-class training and competition facilities for student-athletes, and incorporate new laboratories and research facilities to better understand the potential of human performance. Watch a video of Hayward Field's history and planned future here. The new stadium's permanent capacity will be 12,900, slightly larger than the 10,500 fans it currently holds. This will be expandable to nearly 30,000 for the IAAF World Outdoor Championships in 2021.

Completion 2020

OR, Portland: Providence Park

MLS's Portland Timbers planning a major expansion of their Providence Park Stadium Proposed design by Allied Works would add a 93-foot high covered structure on the east side of the stadium, taking a vertical approach to a relatively small footprint while integrating well with the existing stadium. The proposed project includes four new levels on the expanded east side, with three of the four levels created for reserved and group seating sections to help meet demand, while including a unique, pedestrian-friendly public arcade along SW 18th Avenue.

Capacity 24,644 (21,144)

Completion 2018

PA, Penn State: Panzer Stadium

Penn State University to build new lacrosse stadium at its existing lacrosse field on the University Park campus. The team of Moody Nolan of Columbus, Ohio, and APArchitects LLC of Boalsburg designed the project. PJ Dick of Pittsburgh will construct the stadium. If approved by the university board of trustees the Panzer Stadium project will tentatively begin early phases in July 2017. Penn State Intercollegiate Athletics announced \$3.55 million in gifts for a new lacrosse stadium on the University Park campus.

Cost US\$8.4m

Completion 2018

PA, Reading: Ballpark

Ballpark for Reading Phillies to replace FirstEnergy Stadium as part of proposed RiverView at Reading development.

Cost US\$70m

PA, Philadelphia: Temple University Stadium

Temple University's Board of Trustees voted to authorize the development of preliminary designs (\$1m), usage options and environmental impact studies for a multipurpose retail and football stadium project on the northwest corner of Main Campus. Architect seeks to create a vibrant streetscape experience that blends together the planned stadium, the significant retail components, the adjacent indoor recreation facility and various pedestrian plaza and green spaces. Engagement process under way. Architect: Moody Nolan (Curtis J. Moody). Moody Nolan is also designing Temple's new indoor practice facility next to the stadium site and is collaborating with AECOM (engineering design) and Langan (civil engineering and landscape design). Required funding: \$50m donations. City approvals required. Task force of students, staff, and community members, will advise on maximising use.

Capacity 35,000

Cost US\$126m



**PA, University Park: Beaver Stadium**

Revamp for football stadium which has been in its current location on Penn State's campus since 1960 and seats 107,000. Improvements will be decided as part of the Intercollegiate Athletics' facilities master plan. Athletic director: Sandy Barbour. Aiming to generate more revenue from the stadium beyond football games, attracting concerts, NHL preseason games and international soccer matches.

RI: Providence: Pawsox Ballpark

New owners of Pawsox intend to take the Triple A franchise out of Pawtucket. Undertaking a structural study on McCoy Stadium Target site for new stadium is a piece of freed-up I-195 land near the intersection of Dyer and Dorrance streets in Providence. Plus parking garage (\$10m). Concept design: DAIQ and Populous. Economic consultant: Brailsford & Dunlavy.

Capacity 10,000**Cost** US\$70m**SC, Clemson University Football Complex**

Clemson opened its new Football Operations Complex on February 1. Features include 1.5 acres of outdoor leisure and entertainment space, state-of-the-art training, weight equipment, technology and hydrotherapy. HOK's Sports + Recreation + Entertainment group designed the complex with GMC serving as the architect of record and DPR as the contractor. The training facility for the national champion Clemson Tigers will be the country's largest, most programmatically inclusive football training complex.

Cost US\$55m**SC, Myrtle Beach: Brooks Stadium**

Proposed expansion of Coastal Carolina University's Football Stadium. Donations sought to build fund sufficient for state finance matching. Finance: athletic fund, renovation fund. Depends on approval of financing by South Carolina Commission on Higher Education (CHE). Chants' move to the Sun Belt Conference and to the NCAA's Football Bowl Subdivision means they are required to average 15,000 in attendance per game.

Capacity 19,000 (9,214)**Cost** US\$29.9m**TN, Johnson City: ETSU Football Stadium**

The State Building Commission has approved a project to build a new football stadium for East Tennessee State University. In southwest corner of the university's campus between the Basler Center for Physical Activity and the ETSU physical plant building. To include skyboxes. Third level dedicated to press, game-day operations and logistics. Phase one: 7,000 seats in west and east. Phase two: 3,500 seats along horseshoe stretch. More concessions and toilets. Construction manager and general contractor: BurWil Construction (COO Bill Prince). Team will play two seasons at Science Hill High School's Kermit Tipton Stadium. Finance: student fees and donations.

Capacity 10,500**Cost** US\$26.6m**Completion** Q3 2017**TN, Knoxville: Neyland Stadium**

University of Tennessee (UT) Athletics has completed a comprehensive nine-month feasibility study into future renovations. The overall plan sequences the renovations in phases by beginning at field level and progressing upward and around by concourse. First phase: south concourse 1 expansion and renovation, south field wall movement, visiting team locker room relocation, kitchen and commissary addition, lower/lower west bowl infrastructure rebuild, hospitality area upgrades (e.g. field-level club), upper bowl handrail augmentation, electrical transformer replacement, and storm sewer line repair. Finance: gifts and athletics department. Consultant: Populous.

Cost US\$106m**Completion** August 2019**TN, Memphis: Liberty Bowl Memorial Stadium**

Home to University of Memphis' Tigers football team is seeking to install more than 5,000 premium seats. Finance: Tigers.

Capacity 57,800 (60,000)**Cost** US\$3m**TN, Nashville: MLS stadium**

Plans to bring a Major League Soccer (MLS) expansion team to Nashville boosted by the city's Metro Council decision to approve a \$275 million stadium project. Stadium to be built on a portion of the city's fairgrounds, and includes a funding package of \$225 million in the form of revenue bonds. The MLS stadium plan integrates the new stadium with the existing Metro masterplan for the fairgrounds. Stadium funding would come from a combination of three sources: \$200 million in revenue bonds, \$25 million in cash from the MLS ownership group, and \$25 million in Metro general obligation bonds to pay for public infrastructure associated with the stadium.

Cost \$275 million**TX, Amarillo Ballpark**

Property swap between Coca-Cola and Amarillo Economic Development Corp. likely to allow go-ahead on downtown baseball stadium/multipurpose event venue. City council sorting out zoning and finance. Developer: Local Government Corp. Original developer failed. Development partner and operator sought. Possible tenant/partner: Southern Independent Baseball.

Cost US\$45.5m (US\$30.3m)**Completion** 2017**TX, Arlington: Esports Stadium**

The City of Arlington has announced plans to build an Esports Stadium Arlington, a state-of-the-art esports-specific venue designed to draw competitive players and fans from around the world.

Created in collaboration with Populous, the 100,000ft² space will be the largest and most flexible esports stadium in the country and is set to open its doors later this year in Arlington's entertainment district.

The City of Arlington and Esports Venues, LLC, plan to invest \$10 million into the Arlington Convention Center to transform it into an esports stadium offering the most immersive spectator experience in the live esports event market.

TX, Arlington: Globe Life Field

Architects HKS have been picked to design a retractable-roof stadium and supporting development in the Entertainment District. Site to be parking lot, south of the existing ballpark, south of Randol Mill Road. The design phase of the ballpark is currently underway with construction expected to be begin later in the year. The facility is expected to open in time for the start of the 2020 Major League Baseball season. Putting a roof on Globe Life Park, which opened in 1994 as Rangers Ballpark in Arlington, would be too expensive. Finance: 50/50 public-private partnership (PPP) - Arlington City Council, Texas Rangers - for 30 years. Rangers' 30-year lease on the City-owned Globe Life Park ends in 2024. Economic impact 2016-2054: US\$2.43bn for Arlington and US\$4.35bn for Tarrant County.

Mechanical Engineer ME Engineers

ME is providing MEP and sports lighting design.

Cost US\$1bn**Completion** 2020**TX, Austin: Columbus Crew SC stadium**

Plans have been unveiled for a new stadium for the Columbus Crew SC MLS team. Columbus Crew owners Precourt Sports Ventures (PSV) have been searching for a stadium site since announcing plans to potentially relocate the Major League Soccer club last October. A suitable 24-acre site has now been identified at McKalla Place in north Austin near the Domain.

Cost US\$200m**TX, Texas Tech: Jones AT&T Stadium**

Texas Tech Athletics will renovate both its Football Training Facility and the south end zone of Jones AT&T Stadium after receiving a significant monetary gift. Tech has already made significant upgrades to Jones AT&T Stadium as part of the campaign, notably the North End Zone Club Area, the video board, the North End Zone Colonnade and new FieldTurf surface.

TX, College Station: Softball Stadium

Texas A&M (Director of Athletics Scott Woodward, Senior Associate AD for Facilities and Construction Kevin Hurley) softball stadium approved by board of regents. Exterior will resemble Blue Bell Park, home of Texas A&M's baseball team, as well as the new Track & Field Complex next door. Club level seating as well as two luxury suites. Press box - two radio booths, a TV booth and a writing press area. Locker room, player lounge, training room, video/media room, computer lab, and 6,744ft² indoor hitting facility with four batting cages. Two concession stands, a team store, guest services and restrooms down the first- and third-base lines. Finance: donations. Architect: Gensler Sports.

Capacity 3,000**Cost** US\$28.6m**Completion** 2018**TX, Canyon: West Texas A&M University**

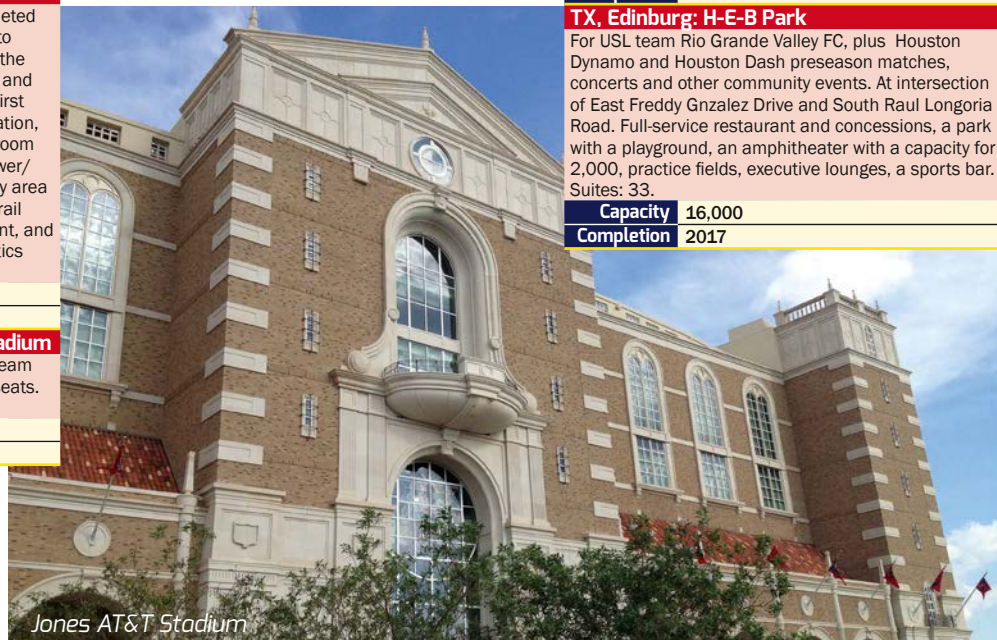
West Texas A&M University will break ground today on the new \$38.8 million on-campus Buffalo Stadium. The new Buffalo Stadium, located in Canyon, Texas, east of the current soccer/track stadium and Jarrett Hall, will be constructed on a north/south axis with easy access to campus. The west side of the football stadium will include a multi-storey building to house concourse-level suites, elevated club seating areas and a modern press box. There will be grade-level entry to the stadium with bowl seating split into an upper level of pre-engineered metal grandstands and a lower level of cast-in-place concrete surrounding a below-grade artificial turf playing field.

Capacity 8,500**Cost** US\$39m**TX, Dallas: SMU Soccer Stadium**

Phase 1 of Southern Methodist University Athletics' Facilities Master Plan, a \$150 million comprehensive facilities investment that will serve the needs of all 17 sports and 400-plus student-athletes. New stadium for men's and women's soccer, at SMU on Mockingbird Lane. Current site will house indoor performance center with full-sized football field and indoor 300-metre track. Director of Athletics: Rick Hart. Finance: donations (80%).

Completion 2019**TX, Edinburg: H-E-B Park**

For USL team Rio Grande Valley FC, plus Houston Dynamo and Houston Dash preseason matches, concerts and other community events. At intersection of East Freddy Gonzalez Drive and South Raul Longoria Road. Full-service restaurant and concessions, a park with a playground, an amphitheater with a capacity for 2,000, practice fields, executive lounges, a sports bar. Suites: 33.

Capacity 16,000**Completion** 2017

Jones AT&T Stadium

TX, Fort Worth: TCU stadium

Amon G Carter Stadium at Texas Christian University (TCU) in Fort Worth will undergo major upgrades after funding for the project was approved. The plans for the home of the university football team include additional luxury seating, two private clubs, 1,000 additional club seats, and a large balcony that will overlook Frog Alley. Work is expected to get underway in May 2018. The expansion will include 48 loge boxes with two private clubs, over 1,000 club seats and 20 luxury suites. There will also be a 100-foot outdoor balcony overlooking Frog Alley, the TCU campus and downtown Fort Worth as well as vast additional premium space that can be used for outside events on game days. Additionally, a new video board will be installed in the north end zone.

Cost \$100 million

TX, Fort Worth: Fort Worth Arena

Ground broken on the site of the new Fort Worth multipurpose arena. Planned to bring a wide variety of programming, including sporting events, concerts, family shows, community and school events, and more. Located adjacent to the Will Rogers Memorial Center campus. Will be the new home to Fort Worth Stock Show Rodeo performances. The arena will have a seating capacity of up to 14,000 for concerts; 13,300 for basketball; 12,200 for family shows and ice hockey and 9,300 for rodeo and equestrian shows.

Capacity 14,000
Completion 2019

TX, Frisco: Toyota Stadium

Multiple upgrades to the 10-year-old stadium. More than 100,000ft² of renovated space, a private club and the National Soccer Hall of Fame Museum. Padded seating in the south end will be covered by a roof and include pre-game dining inside a private club featuring views into the player hallway and out to the field. 7,000ft² outdoor party deck with an outdoor bar, concession stands and a new team store. Upgraded HD video boards, new sound system will improve fan experiences new skyway connecting the West side suites to the premium amenities on the South end. Locker rooms configurable into four separate soccer dressing rooms or combined into two larger rooms for American football events. Developers: FC Dallas, US Soccer, Frisco Independent School District, City of Frisco.

Cost US\$39m
Completion late 2017

TX, Houston: Houston Strikers

Newly formed Houston Strikers rugby team to build stadium as it gears up to join Major League Rugby (MLR) in 2018. Strikers are one of the nine teams looking to take part in the new MLR competition and want to build an 11,000 seat, \$10 million stadium. The Strikers say they are in the process of interviewing stadium contractors and that they will build the venue in sustainable phases.

Capacity 11,000

TX, Prosper: Prosper High School Stadium

Prosper Independent School District (PISD) has completed the design of its new stadium/natorium complex in Texas. The 12,000 capacity stadium, designed by Huckabee Architects, will serve all PISD high schools when it opens in August 2019. This project was approved and will be funded from the \$710 million bond issue passed nearly 10 years ago, coming in with an approximate cost of about \$48 million. Prosper ISD's new district stadium and natatorium complex delivers a state-of-the-art facility for the growing community. The complex will be located to the west of Prosper High School and will be utilised for athletic, extracurricular and community programmes.

Capacity 12,000
Cost US\$48m

Completion August 2019

TX, San Antonio: Alamodome

Expansions and exterior modifications completed. New wings to the east and west concourse, totaling 55,000 square feet of new space. Expanded field level to the north, outdoor terraces and beer garden. Voted through by the Historic and Design Review Commission.

Mechanical Engineer ME Engineers

ME is providing sports lighting and technology design.

Cost US\$42m

UT, West Valley City: Real Monarchs Stadium

Real Salt Lake owner Dell Loy Hansen has signed a letter of intent with city manager Wayne Pyle. 60-day negotiating window. Work in tandem with Maverik Center. Hansen withdrew in February from deal for club and Utah State Fairpark to add a multi-use sports stadium to the fair park.

Capacity 8,000
Cost US\$20-23m

VA, Charlottesville: Davenport Field

Redevelopment of the University of Virginia ballpark – Davenport Field at Disharoon Park. DLR Group's design has introduced a new 'front door' – a memorable gateway for fans, student-athletes, recruits, and visitors. Phase I includes new and enhanced options for viewing the game, including wrap-around elevated concourse, chair back seating, outfield bleachers, berm, picnic terrace, and the new Field Level Club. Team training and recruitment will benefit from the new Pitching Development Center, batting cages, bullpen, and baseball operations suite. Additionally, future phase construction has been coordinated to include suite, club, and party deck spaces added above the expansion concourse, fulfilling the expressed desire for a 'big time' look and feel.

Cost US\$18.6m

VA, Blacksburg: Virginia Tech English Field

Virginia Tech's new ballpark – English Field at Union Park – has opened. CannonDesign designed the dynamic new ballpark in design-build partnership with Whiting-Turner. English Field at Union Park is an exciting new ballpark that celebrates Virginia Tech baseball's rich history and serves as a home for its future. Everything from the Hokie stone to embossed university symbols celebrate Virginia Tech, in Blacksburg, Virginia, and its legacy of baseball success. Overhaul of Virginia Tech baseball team's ballpark. Additional seats, modernised concession stands and a new scoreboard. Four design-build teams presenting designs in June. Senior associate athletic director for facilities and operations: Tom Gabbard. Naming rights: Union Bank & Trust (\$3.5m).

Cost US\$12m-US\$14m

VA, Fredericksburg

Proposed multi-purpose stadium in Celebrate Virginia South development. Aimed at sports tourism market and home to minor league baseball team. Artificial turf fields: 5. Parking: 1,800 (\$7m). Developer: owners of the Hagerstown Suns and Diamond Nation. Architect: Pei Partnership Architects and HKS.

Capacity 4,750
Cost US\$29m

VA, Norfolk: ODU Foreman Field

Old Dominion University has announced plans to rebuild and expand S.B. Ballard Stadium to enhance seating and add modern amenities. Construction will begin this summer and end before the home opener of the 2019 football season. The project will not use state funds or require an increase in student fees. It will be funded by athletic revenue, private funding and bond proceeds. The first phase of the \$65 million project will address many of the recommendations that fans made in a 2016 survey. The stadium will have more than 21,000 seats. Bidders – Construction S.B. Ballard. Architects: Moseley Architects, Populous.

Capacity 21,000
Cost US\$65m

Completion August 2019

VA, Henrico County: Richmond Intl Raceway

Planning future development of more than 1,000 acres along Laburnum Avenue in Henrico County. Cushman & Wakefield and HOK will work to determine the "highest and best use" of the land the racetrack owns and to plan potential future improvements. RIR President: Dennis Bickmeier.

VA, Richmond: Ballpark

Proposed development of minor league ballpark. Flying Squirrels AA affiliate of the San Francisco Giants is reviving interest after failed attempt in 2014.

WA, Tacoma: Soccer Stadium

Seattle Sounders FC and the Tacoma Rainiers Minor League Baseball outfit have signed a memorandum of understanding to develop a new soccer-specific stadium in Tacoma, Washington. Architects: Populous.

Capacity 5,000
Completion 2019

WI, Franklin: Ballpark Commons

Proposed baseball stadium at The Rock sports complex for an independent professional baseball team; an indoor sports complex with four Little League-sized baseball fields and space for other sports; one or two hotels with up to 220 rooms; around 300 apartments; restaurants and other retail space, and an office building. Common Council has authorised financial consultancy. Developer: Mike Zimmerman

Capacity 2,500

WI, Whitewater: UW Athletic Complex

Renovation of campus athletic complex buildings for UW-Whitewater. Director of intercollegiate athletics: Amy Edmonds. Upgrades to football and baseball stadiums, relocation of maintenance shed.

Cost US\$5.2m
Completion September 2017

US VIRGIN ISLANDS**St. Croix: Paul E. Joseph Stadium**

Demolishing the existing stadium (under way) and rebuilding pro baseball field and sports complex to include 750-seat Little League baseball field; associated lighting, a press box and other amenities; an entry plaza with ticket booths; restrooms; a concession building; an open pavilion; a locker and maintenance building; and a permanent St. Croix Christmas Carnival Village. Finance: V.I. Public Finance Authority \$17.5m. Client: VI Dept of Sports, Parks and Recreation. Architect: Steven E. Hutchins. Design consultant: Populous. Design and build: General Engineering Corp.

Capacity 3,500
Cost US\$35m (US\$20m)
Completion June 2018

VENEZUELA**Caracas: La Rinconada Stadium**

Baseball stadium under construction in La Rinconada Park as first phase of a new public park master planned by Rogers Stirk Harbor + Partners. Located just outside the capital, this 36,500-seat baseball stadium is slated to be a venue for the Venezuelan winter baseball league and for international baseball events. The park will include world-class sports venues, public plazas, and a hotel and convention centre. Architect: Gensler

Mechanical Engineer ME Engineers

ME is providing the MEP, sports lighting and technology systems design.

Capacity 36,500
Completion 2017

WEST INDIES**Jamaica, Clarendon: Herb McKenley Stadium**

Work under way but Minister of Transport and Works seeking full finance. Nine-lane, all-weather running track, football field, basketball and netball courts.

Capacity 12,000
Cost US\$200m

Trinidad, Tarouba: Brian Lara Stadium

Refurbishment for moth-balled cricket stadium. Repair, electrical, landscaping, fencing, plumbing, air-conditioning, and elevators. Developer: Urban Development Company of Trinidad and Tobago (UDCOTT). Consultant: NLBA Architects.

Cost TT\$90m (US\$13.5m)
Completion 2017

AUDI FIELD – FROM DREAM TO REALITY

A 22-year dream comes true this summer for D.C. United owners and fans as the new Audi Field state-of-the-art stadium debuts July 14. Feature writer, Steve Taiman gets exclusive insight from ownership and architect.

It has been D.C. United's vision to construct a soccer-specific stadium in the District of Columbia (Washington DC) since the club's inception during the inaugural year of **Major League Soccer** in the US in 1996.

After several failed attempts to secure land in the District, the ownership team, led by Jason Levien, Managing Partner and CEO, and General Partner Erick Thohir, made it their priority to secure a stadium in the nation's capital.

Construction of the \$500 million, 20,000 capacity **Audi Field** stadium at Buzzard Point not only will provide a catalyst for economic growth in the area, but also will make the Southwest DC location a prime destination for sports and leisure.

D.C. United have been given rights to develop nearby District-owned land with a mix of uses, perhaps hotel, office, restaurants and retail.

The team retained **MAC Realty Advisors** to draft a plan for the prime real estate, which could support up to 600,000 ft² of new development.

The stadium will feature seat locations that put fans in the middle of the action and D.C. United partnered with world-famous chef, José Andrés, in conjunction with **Levy Restaurants**, to provide fans with a world class dining experience.

Andrés will curate all concessions for the venue, using it as an opportunity to create a menu that is representative of the global nature of soccer.

Audi Field interior bowl with full house for D.C. United

Another partnership with fans in mind is with Dutch brewing company **Heineken**. The five-year partnership names Heineken as a founding partner of the 20,000-seat stadium, which is due to open on July 14.

Heineken will be the title sponsor of the venue's field-level **Heineken Club**, rooftop bar and additional fan initiatives.

"We are proud to partner with Heineken, another powerful brand that shares our commitment to building the sport in the District, as we begin a new era for D.C. United at Audi Field," Mike Schoenbrun, the club's chief revenue officer, said.

"Black-and-Red supporters are among the best in Major League Soccer, and we are dedicated to raising the bar for fan



Audi Field daytime aerial view showing East entrance
All images courtesy of Populous



experience at Audi Field with the help of Heineken."

The state-of-the-art urban facility will feature 31 luxury suites; the first MLS Party Deck; 2,154 club seats including the EagleBank Club (1,383 seats, 7,133ft²); Director's Club (185 seats, 3,189ft²); Heineken MVP Club (586 seats, 2,697ft²) and Heineken Rooftop Bar (4,436ft²); 190-bike Bicycle Valet Station; and approximately 12,000 ft² onsite restaurant and retail space.

SUSTAINABILITY COMMITMENT

D.C. United and Audi Field are totally committed to sustainability. They are the first sports venue to receive a \$25

million private clean energy funding package for installation of state-of-the-art energy and water efficiency measures at the new stadium.

Measures include an 884 KW solar array integrated on the canopy and throughout the site by DC-based **New Columbia Solar**, and stormwater retention systems.

Funding is through the Department of Energy and Environment's (DOEE) Property Assessed Clean Energy (DC PACE) programme, D.C.'s innovative green funding solution which operates through a public-private-partnership.

Jason Levien, D.C. United Managing Partner & CEO, said: **"D.C. United are committed to building an environmentally responsible stadium, in addition to providing a world class soccer venue. D.C. PACE funding is allowing this project to achieve LEED Gold certification from the US Green Building Council (USGBC) and to save about \$125,000 annually on utility bills through LED lighting on the field and a host of other green measures throughout the site. As the first stadium to use PACE financing, we are excited to make Audi Field a national leader in environmental performance and green community benefits."**

In total, the stadium's PACE-funded measures will result in a 25% reduction in energy use and will reduce emissions by 820 metric tons of CO₂ annually – roughly equivalent to taking 173 cars off the road.

These reductions are critical components of the District's ongoing efforts to achieve the Sustainable D.C.

and Clean Energy D.C. goals, which call for reducing greenhouse gas emissions by 50%, increasing the use of renewable energy to 50% of the District's energy supply, and reducing energy use by 50% by 2032.

In addition, through green roofs, bioretention areas and infiltration basins, the site will provide storage for more than 55,000 cubic feet of stormwater onsite.

Additionally, as part of its final local community benefits agreement, D.C. United will donate \$50,000 for nearby residents concerned about air contaminants during construction; establish a soccer club at Amidon-Bowen Elementary School and offer free game tickets to Jefferson Academy Middle School students; offer scholarships for 25 low-income children to attend D.C. United summer camps and provide non-profits access to the stadium three days a year; and work with the District's Department of Employment Services to provide young adults in the neighborhood summer jobs.

POPULOUS ARCHITECT VIEWS

Rick Strawn, **Populous** Project Manager for Audi Field, has been with the company since the project's inception.

"Populous was hired back in 2015," he told *PS&AM*, **"and we brought on Marshall Moya Design (MMD), based in D.C., as associate architect. They were particularly helpful in bringing on Ecoimpact as LEED consultant, with ownership's goal of achieving Gold certification. MMD also was responsible for designing concessions, the team store, kitchen commissary and pantries, and restrooms. »**

Audi Field main entrance





« “Another owner priority was sustainability, with D.C. United able to get the largest PACE grant ever for a sports venue. This will mean significant energy savings over the life of the stadium, and will help the District’s ongoing efforts to reduce carbon emissions.

“Owners also wanted the venue to feature a diverse seating offering to attract all fans, with three different price-point clubs and three different suite areas priced to appeal to all. Heineken is sponsoring a unique rooftop bar atop the MVP building with its club and suites on the north end, looking down into the pitch.

“All seating is as close to the playing pitch as possible, with some on-site restrictions. Seating grade is as steep

as any in the league, particularly on the north and south sides at 33%.

“Main entrance on the stadium’s northeast corner has a park-like public plaza. From there, fans can see all the way into the pitch. There’s also a new road around the east side of the stadium that is closed for pedestrian traffic for all game or special event days.

“Land to the east of the stadium, known as Parcel B, will be developed by the owners and other partners with about 600,000 ft² of retail and residential space. The site is about a mile and a half from the Capitol and two and a half blocks from the Populous-designed Major League Baseball Washington Nationals Park.

“Our key project team members worked well together on a very tight

construction timeline. Design-build contractor Turner Construction provided their best sports people to oversee the project in terms of both planning and construction. Key design team members included A+F (structural engineer), ME Engineers (electrical-technology services), WSP (civil engineer) and Howe Engineers (fire-life safety protection) as well as several others who were hired directly by D.C. United.

“Beyond a very structured, just in time key materials delivery schedule, there were no major construction problems, and we expect to be ready for the official July 14 opening on time and on budget.”

Speaking for D.C. United, CEO and Managing Partner Leven and General Partner Thohir said: “Every detail that

Main entrance atrium view

VENUE IN
FOCUS
AUDI FIELD

D.C. UNITED AUDI FIELD

Project Team and Fact File

Location	Washington, DC
Opening Date	July 14, 2018
Construction Cost	US\$ 500 million
Owner	District of Columbia
Operator	MLS D.C. United
Capacity	19,400 seats
Architects	Populous & Associate: Marshall Moya Design
Design-Build Contractor	Turner Construction
Structural Engineer	A+F Engineers
Electrical Technology Services	ME Engineers
Fire & Life Safety Protection	Howe Engineers
Civil Engineer	WSP
LEED Consultant	Ecoimpact
F&B Concessionaire	Levy Restaurants
Major Tenants	MLS D.C. United

Amenities

31 luxury suites: 7 Field Level (West), 5 MVP (North Building), 18 Standard and 16-seat Party Suite, 1,351ft² (East) with first MLS Party Deck; 2,154 Club Seats: EagleBank Club (East), 1,383 seats, 7,133ft²; Director's Club (East), 185 seats, 3,189ft²; Heineken MVP Club (North building), 586 seats, 2,697ft² and Heineken Rooftop Bar, all fans, 4,436ft²; 190-bike Bicycle Valet Station; approximately 12,000 ft² onsite restaurant & retail space.

went into this stadium was made in an effort to maximise the individual experience of fans and we are working closely with our fans to create the most engaging game-day experience possible. Through our partnership with Levy and José Andrés, an ardent soccer fan and D.C. United supporter, we will provide fans with an unprecedented stadium dining experience.

"We are applying the latest technological advances throughout the venue that will enhance our fans' visit to Audi Field and we are working closely with our supporters to curate a thrilling game-day fan atmosphere." ■

Audi Field night aerial view



FACILITY WATCH

in association with



ARENAS

ASIA & AUSTRALASIA

AUSTRALIA

Brisbane: Live Precinct

Arena and entertainment precinct proposed for the Roma Street rail yards. Developer: AEG Ogden.

Capacity 17,000
Cost AU\$2bn

Gold Coast: Convention and Exhibition Centre

Commonwealth Games 2018: netball in 5,000 seat capacity arena. Overlay works only. The International Broadcast Centre (IBC) and Main Press Centre (MPC) will also be located in this venue, forming the Main Media Centre. Owner: Department of Public Works.

Coomera Sport and Leisure Centre

Commonwealth Games 2018: gymnastics, basketball and netball. Outdoor courts, change rooms, administration and a café. Indoor courts: 9. Gym: 2,500m². for a dedicated gym. Area: 10,000m². Green: systems to minimise the use of light, power and water. Architect: BDA Architecture/Peddle Thorp (Director Peter Brook).

Capacity 7,500 (temporary)
Cost AU\$52m

Frankston Regional Basketball Centre

In Victoria. First stage upgrade. Courts: 10 (6). Upgrades to spectator seating, car parking, change rooms and public toilets. Finance: federal government \$4.95m, state government \$2.5m, council \$4m, Frankston and District Basketball Association \$1m.

Cost AU\$12m

Melbourne and Olympic Park

Stage two of the Melbourne & Olympic Park redevelopment, being financed by the State of Victoria (AUS\$298m) and the Melbourne & Olympic Park Trust (AUS\$40m). The project includes the refurbishment of Rod Laver Arena and a new 5,000-seat show arena. Phase 2 developments also include a new eastern entrance, better loading bay, rigging and automated retractable seating, construction of footbridge over Batman Avenue and a new Administration & Media building. Construction on Stage 2 to begin after the 2016 Australian Open. The Administration and Media Building open design EOI is available at: www.tenders.vic.gov.au. Construction (Rod Laver refurb): Lend Lease. Engineering (Administration and Media Building): Arup and HASSELL. Architect: COX Architecture (Patrick Ness).

Mechanical Engineer ME Engineers

For the Rod Laver Arena refurbishment ME is providing ESD scope, modeling to evaluate thermal comfort and providing design recommendations to reach LEED Gold certification as well as peer review of MEP design.

Cost AU\$338m
Completion 2019

Sydney: Ken Rosewall Arena



Roof to change tennis venue to multi-purpose facility. Oculus design on a rotating louvre system that would allow the control of light and ventilation while also providing protection from wet weather. Developer: Sydney Olympic Park Authority (SOPA). Architect: BVN Architects (Ross Seymour). Tenants: Sydney Kings and NSW Swifts. Finance: SOPA, state government. Backing: Tennis NSW, Netball NSW and Basketball NSW.

Capacity 11,000
Completion 2018

CHINA

Beijing: National Speed Skating Stadium

Part of bid for the 2022 Winter Olympic Games and scheduled regardless of the result. West of the Olympic Park and south of the National Tennis Center. For both athletic training and public recreational use.

Capacity 12,000
Completion 2017

Hong Kong: Kai Tak Sports Park



Tender expected in summer 2017 after financial package agreed with government for arena for badminton, volleyball, basketball and other community sports, as part of 24 hectare sports hub as part of redevelopment of former Kai Tak airport site. Potential to hold events such as Sudirman Cup. Discussions around capacity, especially for badminton which attracts nearly 6,000 at Hong Kong Coliseum. Developer: Home Affairs Bureau. Finance: public.

Capacity 7,000
Completion 2020

Hubei Province: Yichang Sports Centre Arena

Arena to include a 4,000-seater shooting hall and a 2,000-seater tennis court. Separate swimming hall for 1,500 visitors.

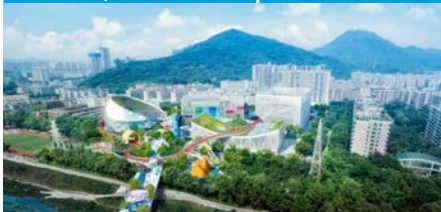
Capacity 6,000

Jiangsu Province: Yancheng Sports Arena

Jiangsu Province: Yancheng Sports Centre Arena Indoor facility as part of multi-sport centre.

Capacity 6,000

Shenzhen, Nanshan: Xili Sports Centre



Basketball and badminton arena (15,000m²), a multifunctional arena (10,000m²), swimming pool (6,000m²) and theatre. Elevated running track weaves in and out of all areas. Plaza level with lobby, changing rooms, second basketball venue surrounded by a mezzanine for badminton, fitness spaces, and a sports bar. Gets under way in 2017. Area: 105,000m². Owner: Shenzhen Nanshan Government announced.. Architect (competition winner): MVRDV and Zhubo Architecture Design.

Suzhou: Arena

Sports and entertainment arena. Developer: Suzhou Industrial Park Sports Industry Development Co. Ltd (SIPSID). Building services, energy planning and LEED green building consultancy services: Mott MacDonald. One of five facilities on a single campus.

Capacity 13,000
Completion 2017

Zhejiang Province: Ningbo Sports Arena

Arena plus swimming hall (+3,000) as part of Ningbo Sports Centre.

Capacity 13,000 (arena), 3,000 (swimming)

JAPAN

Tokyo: Olympic Aquatics Centre

Tokyo 2020: swimming, diving and synchronised swimming. Legacy as Tokyo Tatsumi International Swimming Centre. Owner: Tokyo Metropolitan Government.

Capacity 20,000, legacy 5,000
Cost \$363.189m

Ariake Arena

Part of the Waterfront sports area. Tokyo 2020: volleyball and Paralympic basketball final. Legacy: for national volleyball league, and international competitions. Owner: Tokyo Metropolitan Government.

Capacity 15,000, legacy 12,700
Cost \$199.131m

Water Polo Arena

Temporary structure. Tokyo 2020: water polo.

Capacity 6,500

Youth Plaza Arenas A and B

Tokyo 2020: badminton, basketball. Legacy: large gymnasiums. Owner: Tokyo Metropolitan Government.

Capacity A 7,000 (legacy 5,700); B 18,000 (legacy) 16,300
Cost \$411.84m

INDONESIA

Jakarta Velodrome

For the 2018 Asian Games, to cycling federation standards and in legacy converted to multi-use. Stakeholder workshops have already kicked off the design process. A modular structure will be used and readily available materials chosen. Roof: membrane. Contractor: ES Global, leading the Design & Build team – Cox Architecture, engineering Mott MacDonald, construction Wika and local architects BKM.

Capacity 3,000
Cost US\$40m
Completion June 2018

KOREA

Seoul Ballpark

New baseball stadium next to the Han River and sport facilities built for the 1988 Summer Olympic Games. Part of the city's urban development plan in Jamsil, southeastern Seoul. Current stadium will be demolished to make way for exhibition and convention facilities covering 100,000m². Olympic swimming pool and gymnasium will also be renovated into an indoor sports complex. Home for LG Twins and Doosan Bears, to begin 2021. Developer: Seoul Metropolitan Government (SMG).

Capacity 35,000
Cost Won 2-3 trillion
Completion 2023

MALAYSIA

Nilai: Velodrome

Indoor velodrome to be built by youth and sports ministry.

Cost US\$24m

NEW ZEALAND**Christchurch: Metro Sports Facility**

10-lane competition pool and seating for a minimum of 1,000 spectators, a leisure area including hot pools and hydrosides, nine indoor sports courts and retractable seating for a minimum of 2,500 spectators. Base for High Performance Sport New Zealand and spaces for fitness and other activities. Request for proposals from construction companies in progress. Architects: Warren and Mahoney, Peddle Thorp Architects and MJMA. Engineering team: Aurecon and ARUP, Powell Fenwick Consultants, Aquatic Design and Engineering.

Capacity 3,500

Hawke's Bay: Multiuse Velodrome

Council choosing design team for the construction on a design-build basis of an indoor track cycling and multiuse facility alongside Pettigrew Green Arena. Seeking to maximise club and community use, host Cycling New Zealand development programmes and national events, and supports the region as a whole by being a multiuse facility used by other sports and a range of community events. 250-metre cycling track, three courts, 300-metre walking track. Business case and design stage: NZ\$500,000. Finance: council, private donations.

Cost NZ\$15m

EMEA**CZECH REPUBLIC****Pardubice: Dukla Sports Centre**

International architectural and urban planning competition – begins June, ends October – to find design for multifunctional sports complex. Area: 85,000m². Close to the city centre, offering excellent transport access and strong potential for development. Indoor athletics hall, a multifunctional sports hall for ball games (with a capacity of 2,500 spectators), plus facilities for gymnastics, martial arts and other sporting activities. Outdoor sports facilities plus all essential infrastructure – a restaurant, office premises, storage areas, accommodation, and facilities for physiotherapy, massage etc. Project team assembled from sports clubs plus architects and City officials. Project Manager: Miroslav Janovský. Planning and design budget: 12m CZK (€450,000).

Cost 200-200m CZK (€7.5m-9m)

EIRE/REPUBLIC OF IRELAND**Cork: Concert Centre**

An Bord Pleanála has granted planning permission for Cork concert centre on Albert Quay in Cork city centre. Developer Owen O'Callaghan. (Heineken Ireland and Bam have also proposed a concert venue on the site of the former Beamish brewery.) Area: 100,000ft². Jobs: 300 (construction), 40 (permanent), 150 (part-time).

Capacity 7,500 (5,000 seated)

Cost €50m

Dublin: Liffey Valley Ice Arena

Arena with international competition-size ice rink to host major tournaments – figure skating, ice hockey – and community use, as well as serving as a major leisure destination for the Liffey Valley Shopping Centre. An application for planning permission is currently being considered by the planning authority. Consultant: Vibrant Partnerships. Property developer: Hines.

Capacity 2,500

ENGLAND**Birmingham Aquatics Centre**

Plans have been unveiled for the Birmingham Commonwealth Games 2022 aquatics centre in Sandwell – including an Olympic-sized swimming pool. Sandwell Council is proposing to build the centre on part of the site at Londonderry Playing Fields in Smethwick. The centre would feature an Olympic-sized competition swimming pool and a 25m diving pool, plus 5,000 spectator seats. Also planned at the centre – which would be run by Sandwell Leisure Trust – are two activity studios, a 12-court sports hall, a 125-station gym, a 25-station ladies-only gym, an indoor cycling studio, a sauna/steam room and a café.

Cost £60m

Bristol Arena

Buckingham Group's work on the project put on halt while new site considered. Possible new site identified at the Brabazon hangar at Filton, which was used for the construction of aeroplanes after World War Two. KPMG carrying out "value for money" study for project. Original plans call for multipurpose arena on 'arena island' in Temple Quarter Enterprise Zone on site of old diesel depot. Part of city centre regeneration near Temple Meads station. Encouraging public transport, new footbridge to come. RIBA international design competition winners: Populous, working with local architects Feilden Clegg Bradley Studios, BuroHappold Engineering and Vanguardia Consulting. Consultant: AECOM. Preliminary work: £250,000. Programme manager: Stuart Woods. The local enterprise partnership is working with the mayor to advance the project. Operator: SMG and Live Nation.

Capacity 12,000

Cost £91m (£80m)

Completion 2020

Cambridge Ice Arena

Permanent rink to international standards (56m x 26m) for university hockey team and public skating. On land leased from Marshall next to the Newmarket Road Park & Ride site. Operator: Cambridge Leisure and Ice Centre (Chairman Professor Bill Harris). Consultant: Cool Venues (Jim Kay). Finance: loan South Cambridgeshire District Council (25 years).

Capacity 1,000

Cost £1.85m

Completion 2017

Gateshead: Gateshead Quays

Three firms of architects, headed by HOK appointed to design the new £200m regional arena and conference and exhibition centre for Gateshead Quays. Team to plan the 10-acre site on Gateshead Quays. HOK have been appointed to design the new 12,500 seat arena and international conference and exhibition centre. AHR Architects has been selected to develop and design the overall masterplan of the site including hotels, bars and restaurants and car parking for the scheme. Planit-ie, with particular experience in designing outside spaces, has been selected as landscape architects.

Capacity 12,500

Cost \$200 million

Hull: Hull Venue

Super theatre style venue adjacent to Princes Quay in Hull City Centre. For concerts, conferences, family shows and exhibitions. The centre will include a large auditorium, exhibition space, conference auditorium, food and beverage outlets, break out spaces and a public realm to fully support all inclusive access. Part of wider retail development. Architect and Design Team Leader: AFL. Operator SMG.

Capacity 3,500

Cost £36.2m

Completion Q2 2018

London: Leyton Ice Arena

Lee Valley Regional Park Authority is consulting on developing a new twin pad ice centre on the site of its existing ice centre on Lea Bridge Road, Leyton. To complement the Council's regeneration programme for the area.

Newcastle: Eagles Community Arena

Work has now begun on a brand new, purpose-built community sports arena as the new multi-million pound home for the Eagles Community Foundation (ECF). The state-of-the-art venue will host the region's most successful sports team – Esh Group Eagles Newcastle. It is anticipated that more than 11,000 people will be engaged in sport during the facility's first year. And more than 1,000 disabled users will be encouraged to play sport annually at the arena – based at Riverside Dene in Elswick, reflecting the ECF's commitment to deliver recreation and education opportunities to the wider community. The new venue will provide a home for the ECF and enable it to develop its current player pathway structure under one roof whilst also providing educational routes and workforce development. The move to the 2,800-seater venue will allow the most successful franchise in British basketball history to pursue its long-term dream of competing on the European stage.

Capacity 2,800

Reading: Royal Elm Park Convention Centre

Convention centre, ice rink, restaurants and a large public square. Mixed use development next to Madejski Stadium. Development consultant: Peter Brett Associates. Technical services: Arup. Convention centre design: NRY Architects.

Sheffield Community Arena

Future home of the Sheffield Sharks basketball team. Finance: private. Multipurpose for sport, culture and business. Courts: 3. See Olympic Park Stadium for more details about the Park.

Capacity 3,000

FINLAND**Tampere Central Arena**

Multipurpose arena above the existing railroad track near the city's main railway station as part of the new urban city centre development. 5.5 million passengers passing yearly. Intends to be event and promoter friendly and the most modern in Europe for event and fan engagement, technology and sustainability. Suites: 46. Party suites: 6. Restaurants: 6,750m². Integrated training ice for ice hockey, figure skating etc. 400-room integrated hotel. Architects: Studio Daniel Liebeskind, Aihio Architects, Ramboll. Concept Design: Sport & Live Vision, Ramboll. Developer & Construction: SRV Group. Owner: Investment group. Finance: Tampere City €26m, private €76m (€26m loans).

Capacity 12,000 (hockey), 15,000 (concert)

Cost €124m (€95m) (plus €12.5m car park)

Completion 2020

FRANCE

Bordeaux Arena

Multipurpose hall. Flexible seating capability. Events: 118. Parking: 4,000. Developer: Communauté urbaine de Bordeaux (CUB). Build and operate consortium: Group Lagardère Unlimited, DV Construction, Rudy Ricciotti architects and Bouygues energy. Funding: City of Bordeaux.

Capacity 11,000
Cost €49.2m

Completion 2018

Dunkerque Arena

New mayor has confirmed more modest arena than previously.

Capacity 5,000-6,000
Cost €15-20m

Completion 2017

Villeurbanne-Lyon: ASVEL Arena

For basketball tenant Olympique Lyonnais, plus other sports such as handball, concerts and business events. Earlier project didn't get off the ground. At current location of the Georges-Lyvet Stadium, close to the current basketball arena, Astroballe. Finance: private.

Capacity 10,500 (basketball), 12,000 (concert)
Cost €45-55m

Completion 2020

GERMANY

Erlangen Sport Complex

Multi-functional gymnasium, bouldering/climbing facilities, office spaces and space for university sports science study. Owner: Stadt Erlangen Area: 19,000m². Architect: Schulitz Architects.

Capacity 3,000

Kassel: Multipurpose Arena

Feasibility study (euros 80,000) under way for arena to be home of German Bundesliga handball team MT Melsungen and boxing. Discussions on financing with town. Developer: Herbert Aukam. Area: 12,000m².

Capacity 7,500-10,000
Cost €30m

Kaufbeuren: Eisstadion

Modelled after a block of ice, situated on the training ground of the Park Stadium. CCTV and an ammonia evaporation plant. Architect: asp.

Capacity 3,500
Cost €22.5m
Completion June 2017

Koblenz: CONLOG Arena

Upgrade menu list issued for ageing arena: seating €1.1m, floodlighting (€60,000-€200,000), a new video scoreboard (€250,000) and a new sound system (€250,000), space for seminars and conferences (€800,000).

Selb: Netzs Arena

Town is funding modernisation of home of VER Selb ice hockey club to meet safety standards by building two separate sets of facilities for home and away fans. Finance: Government of Upper Franconia/VER Selb ice hockey team.

Cost €1.1m
Completion 2017

KUWAIT

Kuwait: 360 Mall Tennis Arena



Sheikh Jaber Al Abdullah Al Jaber Al Sabah International Tennis Complex in retail development, also with hotel. Developer: Tamdeen Group. Two main arenas – 4,000 and 1,600, eight indoor courts with over 500 seats and eight outdoor courts with 1,500 seats. Doubles up as an entertainment venue.

Capacity 7,600

NORWAY

Oslo, Nye Jordan Amfi Sports Arena

Ice hockey arena for elite and recreational sports, and public events. Restaurants, cafes and conference facilities. The project will also address Jordal Athletic Park as an important recreational area. Developer: Culture and sports Oslo KF CO₂ neutral construction. Developer: City of Oslo's Municipal Body for Culture and Sports Facilities (Simen Bakken). Construction: NCC (Brudevold Eek) – SEK 445m (US\$49m).

Capacity 10,500
Cost €70m

ROMANIA

Constanta Arena

For tenant handball team HCM. Also on site: indoor Olympic pool (2,000), gymnasium (1,000), hotel, pedestrian plaza landscaping and water elements. Parking: 2,000. Area: 37,500m².

Capacity 10,500
Cost €70m

RUSSIA

Krasnoyarsk: Platinum Arena

Multi-level, multi-functional sports and entertainment complex with an ice arena for the 29th Winter Universiade Krasnoyarsk 2019. Near river bridge which connects river bank area with both sides of the city. Primarily intended for winter sports competitions: figure skating, ice hockey, short track. Area: 22,500m². Design and construction: Russian Platinum (Director General Yevgeniy Vorobeychik).

Capacity 7,000
Cost 3 billion rubles (US\$39m)
Completion end 2017

SCOTLAND

Aberdeen: AECC

Aberdeen Exhibition and Conference Centre (AECC), off the A96 near Aberdeen International Airport, will be four times the current exhibition space and increase the arena seating capacity from 4,750 to 15,000 (standing). Hotel, leisure, restaurants. Multipurpose arena: 9,000m². Floor space: 45,000m². Owner: Aberdeen City Council. Development partner: Henry Boot Developments. Construction: Robertson Construction Group.

Capacity 10,000
Cost €333m

Completion Q2 2019

Edinburgh Ice Arena

Proposed refurbished hockey and curling arena in the Murrayfield quarter as part of mixed use development. Proposal of Application Notice (PAN) lodged. Consultation with Scottish Rugby Union (SRU), Edinburgh Curling Club Ltd, Murrayfield Ice Rink Ltd. Developer: Murrayfield 2020.

SENEGAL

Dakar: Basketball Arena

Potentially home to Senegal basketball, women and men.

Capacity 15,500
Completion Q2 2017

SPAIN

Barcelona: New Palau Blaugrana

On the current site of the Miniestadi, next to the new Camp Nou station on Metro Line 9. Areas that can operate independently. Multi-purpose pavilion (10,000 for Euroleague), auxiliary court (2,000), ice rink. VIP boxes: 24. Skybars: 4. Press area: 200m². Start: 2017/18 season. Masterplan of Palau, annex court, ice rink and the FCB Escola facilities. Architects and Barça technical teams and the Barcelona City Council are working on the integration of the new facilities with the rest of the Espai Barça and the city. Arena will maintain energy in a unique asymmetrical configuration to create a wall of people in the bowl. Metallic facade and transparency, with large projection screen. Outdoor concourse with concessions for open air festival environment. Owner: FC Barcelona. Architect: HOK + TAC Arquitectes (Eduard Gascón).

Capacity 10,000 (12,000 concerts)
Cost €100m
Completion 2020

U Arena



SWITZERLAND**Lucerne: Pilatus Arena**

New arena for handball club HC Kriens. Multipurpose for volleyball, tennis and concerts. City to make land available. Developers: HC Kriens-Luzern. General contractor: Sarnen AG.

Capacity	4,000
Cost	€28m
Completion	2018

Zurich, Altstetten: Theatre of Dreams arena

Business plan for pure ice hockey arena after multipurpose ambitions dropped on cost grounds. Home for ZSC Lions. Finance: €33m private + city of Zurich.

Capacity	12,000
Cost	€146m
Completion	2018

UNITED ARAB EMIRATES**Dubai: Meydan Arena**

Part of Meydan One project. Arena at the base of the indoor ski-slope for live concerts, sports and theatrical. Outdoor leisure sport options.

Capacity	8,000
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Abu Dhabi: Yas Arena

Abu Dhabi is to build a new multipurpose sports and entertainment arena in the city. Yas Arena's dynamic form and illuminated lantern facade is intended to both complement and animate the expanding waterfront promenade at Yas Bay. HOK is part of the WSP-led team responsible for delivering the design of Yas Arena, with support from Pascall+Watson. In addition to the architectural design of Yas Arena, HOK designed the adjacent arena retail and dining destination along the boardwalk, forming a mixed-use anchor on the east end of Yas Bay. The arena is designed to expand from an intimate 500-seat theatre to an 18,000-capacity venue, maximising revenue and supporting a wide variety of events. Premium spaces include a VIP lounge that can be transformed into a grand ballroom for events, hospitality boxes and unique terrace bars for receptions and parties.

Capacity	18,000
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WALES**Swansea Arena**

Proposed on the current LC car park site. A new underground car park. Part of city improvement plan with improved links between the centre and the waterfront. Owner: Swansea council. Developer: Rivington Land.

Capacity	3,500
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Cardiff Arena

Atlantic Wharf to be named the preferred location for Cardiff's planned 15,000-seat indoor arena. The proposed new multi-purpose facility – which could bring major cultural, sporting and entertainment events to Wales' capital city – could be built across two sites in Atlantic Wharf adjacent to Cardiff Council's County headquarters and the nearby Red Dragon Centre in Cardiff Bay.

Cost	£85m
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AMERICAS**CANADA****Calgary Arena**

Proposed new multi-purpose home in West Village district for Flames NHL team, to replace the Saddledome. Possible link with council-funded fieldhouse.

Conception Bay North, Newfoundland: Arena

New Multi-purpose facility in Harbour Grace. Single-pad NHL-size ice surface, community room and kitchen. Replaces S. W. Moores Memorial Stadium. Finance: provincial government \$15m, Town of Harbour Grace \$6m. Construction: Pomerleau.

Cost	\$21m
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Fort McMurray, Alberta: Arena

Downtown sports and entertainment centre. A privately owned hotel would be built with interior access to the arena. Developer: Regional Municipality of Wood Buffalo. Consultant: International Coliseum Company. Hope to attract a NHL affiliate. Projected total cost over 40 years, including financing, operations, facility updates for arena, parkade and retail space: \$580m. Public engagement sessions set for late spring 2016. Finance: Capital cost for arena \$120m, capital cost for parking structure with 508 stalls \$29m, capital cost for retail space to be built into the facility \$7.2m. Events: 70.

Capacity	6,200 (expandable to 8,000)
Cost	C\$404m
Completion	July 2018

Kitchener Arena

Kitchener Rangers interested in expanding Memorial Auditorium or building new arena. Preparing business plan and detailed development proposal. Architect: BBB Architects. Construction: Ball Construction.

Capacity	10,000 (extension)
Cost	C\$44m

Peterborough Hockey Arena

Hockey arena to replace the aging Northcrest Arena with a multipurpose facility. Possible location: Morrow Park. Possibly to host Agricultural Society's annual Peterborough Exhibition. Two ice pads and support for community and college sports.

Cost	C\$27m
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PortToronto Arena

PortToronto to provide federally owned lands at the foot of Cherry St. for two rinks. Area: 75,000ft². Build/operate developer sought. Working with the city and Waterfront Toronto to ensure the building fits the future vision of the area.

Completion	2018
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Oakville: Oakville Arena

First phase of design and construction to update ice arena. Built in 1950, it is one of four remaining arenas in Ontario with a wooden truss roof system designed by Norman Otto Hipel. To include walking track, gymnasium, seniors' centre with a separate entrance, administrative offices, a new Kinsmen Pine Room for public meetings and events, National Hockey League (NHL)-sized ice surface of 85' x 200'. Owner: Council (Town Recreation Services Senior Manager Michael Brennan). Delivery: Integrated Project Delivery – three-party agreement with architect and general contractor at the outset. Begin: 2017.

Capacity	450 (1,100)
Cost	C\$36.7m
Completion	Q3 2018

Ottawa: LeBreton Flats Entertainment Centre

Arena for Ottawa Senators as part of proposed RendezVus development on LeBreton Flats. For Ottawa Senators, concerts and possibly more. Bids from design/build groups – RendezVus LeBreton Group (arts spaces, community theatre and commercial areas attached to the concourse – Matt Rossetti) and Devcore Candarel DLS Group (BBB Architects plus subsidiary Stadium Consultants International) with hockey and fans focus. Developers: Senators and Windmill Development Group.

Saskatchewan, Saskatoon: Merlis Belsher Place

Twin-pad arena for the men's and women's Huskies at University of Saskatchewan. Funding raising Home Ice Campaign to replace the Dog House (now beyond repair). Finance: donations (Merlis Belsher \$12.25m) – \$34m so far).

Capacity	1,830
Cost	C\$41m

Sudbury: True North Strong Event Centre

Proposed downtown multi-use sports and entertainment venue in a mixed-use development area to include a hotel. Tenant: Sudbury Wolves.

UNITED STATES OF AMERICA**AK, Anchorage: UAA Arena**

Proposed sports centre for the University of Alaska Anchorage. Possible tie-in with UAA Seawolf ice hockey to replace Sullivan Arena.

Cost	US\$80m
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AZ: McKale Center

For University of Arizona. Enclosed concourses wrap around 36-year-old McKale Center in a proposed upgrade plan. Improved locker rooms, equipment rooms, showers, offices and lounge areas, concessions areas, bathrooms, air conditioning and premium seating. A new gift shop to be located at the south end of Cherry Avenue parking garage.

Cost	US\$155m
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CA, Riverside: CBU Events Center

Two-storey facility for California Baptist University athletic events, graduation ceremonies, orientation activities, chapel program. Locker rooms for home and visiting teams, athletics suite and offices. Area: 153,000ft². Construction: Sundt Construction.

Capacity	5,050 (expandable to 6,500)
Cost	US\$73m
Completion	April 2017

CA, San Francisco: Chase Center

New sports and entertainment center at Mission Bay as part of Golden State Warriors' (co-owners Joe Lacob and Peter Guber) plan to return to San Francisco. In Mission Bay area. COO: Steve Collins. Basketball, concerts, family shows. Retail: 100,000ft². Plazas: 3.2 acres. View deck with vistas to Bay. Office, biotech/lab space. Parking: 950. Bikes: 300. Finance: private. Developer: GSW Arena LLC (President Rick Welts). Updated design revealed. Architect: MANICA Architecture. Senior Design Advisor: Snohetta's Craig Dykers. Interior design architect: Gensler (Ron Turner). Full details at: warriors.com/sf. Construction: JV Clark Construction Group and Mortenson Construction.

Capacity	18,064
Completion	2019

CA: Sacramento State University campus

Proposed expansion of University Union Well includes arena for ceremonies, concerts and special events.

Capacity	5,000-6,000
Cost	US\$175m (overall)

CO, Colorado Springs: Edward J. Robson Arena

On-campus hockey arena at Colorado College on the west side of Nevada Avenue, part of a campus master plan the college's Board of Trustees approved in 2015. Replaces Honnen Ice Arena. CC's Division I hockey team will practice in the new facility and continue to play its games in the Broadmoor World Arena. Finance: donations (Edward J. Robson \$8m). Sustainable building practices and materials.

Capacity	900
Cost	US\$10m

CT, Hartford: XL Center

In 2015 the consultants, SCI Architects of New York recommended three options for the arena: work with the existing building, embark on a major renovation and expansion; or replace the structure entirely on the present site. The authority settled on the second option because, even at \$250 million, it was half of the \$500 million for a new structure. The project would be spread across several fiscal years and paid for almost entirely by the state but needs the political support from both Gov. Dannel P. Malloy and the state legislature to secure funding – which is not yet forthcoming. If legislative approval is secured, construction could start the following year and be completed by 2019. The plans envision a dramatic change that would essentially create a new arena: a second concourse to relieve congestion and irritating waits at concessions; more "premium" seating lower in the arena; and more amenities and restrooms.

Developer: Capital Region Development Authority. Potential to be home to UConn Huskies men's and women's basketball and hockey teams. Architect: SCI Architects.

Mechanical Engineer	ME Engineers
ME is providing full MEP design.	
Cost	US\$250m-US\$500m





DC, Congress Heights: Practice and Entertainment Arena

Architects developing designs for the Entertainment and Sports Arena in the Congress Heights neighbourhood of Washington, DC. Practice facility for the Washington Wizards, home court of the Washington Mystics Also aiming to drive urban regeneration to the communities east of the Anacostia River. 35% of the work will be performed by Small Business Enterprises. Jobs: 600 (construction), 300 (permanent). Split bowl design for intimate viewing of non-basketball programming. Exterior facing retail bays. Undulating roof and local materials chime with local architecture. Architects: Marshall Moya Design and ROSSETTI (Tony Reiner). Program management: Brailsford & Dunlavey. with ADC Solutions and Kumi Construction Management. Operator: Events DC (CEO Gregory A. O'Dell).

Capacity 5,000
Completion Q3 2018

DE, Smyrna: Delaware Sports & Ent Complex

Delaware University and Delaware Civic Center Corp are working on a \$92.1m complex, to include a 14,829-seat football stadium and a 7,500-seat arena, which would house the DSU basketball teams. Finance package sought: \$40m state bond, \$11.6m private, \$3.5m consortium. Management: Global Spectrum. Events: 155 per year including minor league hockey.

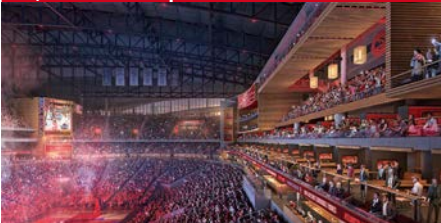
Capacity 14,829 (stadium) 7,500 (arena)
Cost US\$92.1m

FL, Tampa Bay: Sun Dome

Renovation for 30-year-old home to USF basketball and concerts. Centre-hung scoreboard, concessions and restrooms in new concourse and club-levels. Finance: \$8.5m cash and 20-year funding.

Capacity 10,000
Cost US\$35m

GA, Atlanta: Philips Arena



Remodel of home of Atlanta Hawks has begun after funding was approved by the Atlanta City Council. Mayor Kasim Reed committed to provide \$142.5 million in funds, with the Hawks funding the remainder, to improve the city-owned facility in order to revitalise the arena as a basketball-first, world-class venue. As part of the deal, the team's lease was extended through the 2047-2048 season.

The redeveloped arena will include new amenities on every level of the building, 360-degree connected concourses at all levels, improved sightlines and state-of-the-art video throughout the building. The renovation includes removing a wall of suites on one side of the arena, possibly moving a bank of VIP accommodation.

Mechanical Engineer ME Engineers

ME is providing MEP design.
Cost US\$192m

GA: Augusta Arena

The city's Coliseum Authority seeking support for a replacement to James Brown Arena. Seeking SPLOST funding.

Cost US\$110m

GA: Savannah Arena

Recommendation for multi-purpose arena to host minimum 93 major events per year. Possible minor league sport tenants. City consulted on general concept, project scope, site options, and also possible funding sources. Will replace 45-year old Savannah Civic Center. Infrastructure works required, including parking. Finance: SPLOS tax \$120m. Consultant: Barrett Sports Group. Architect: Gensler.

Capacity 9,300
Cost US\$140m

IA, Iowa Arena

Arena and sports performance complex at Coralville's Iowa River Landing. Council reviewing plans March 2016. Architect: JLG Architects (preliminary design \$99,500). Seeking \$12m state assistance.

Capacity 7,000
Cost US\$45m
Completion 2017

IA: Mason City Events Center

City Council supporting pre-application downtown redevelopment project Our River City Renaissance to include hotel, performing arts pavilion, retail outlets, apartments and a multipurpose ice arena. Tenant: North Iowa Bulls. Finance: city, state, private.

Capacity 2,400 (sport), 5,000 (concert)
Cost US\$36.2m

ID, Moscow: Idaho Arena

Stand-alone athletic venue for basketball and volleyball at the University of Idaho, just north of the Kibbie Dome. Area: 70,000ft².

Capacity 4,700
Completion Spring 2020

IL, Rockford: MetroCentre

Exterior façade update, new box office and main entrance, video scoreboard, 11 corporate suites, club boxes, 200-person group terrace, retail centre, additional bathrooms, and new concession stands and food courts. Client: MetroCentre Authority. Renovation to support purchase of American Hockey League franchise, the elevation of the Rockford IceHogs into the American Hockey League, and a 10-year affiliation agreement with the Chicago Blackhawks.

Cost US\$23m

IN, Angola: Thunder Steel Dynamics Ice Rink

For Trine University men's and women's hockey teams. Finance: donations (Steel Dynamics \$1.25m).

Cost US\$8.2m
Completion fall 2017

IN, Buffington: Harbor Arena

Multipurpose proposal. Developer: Majestic Star Casino. Planning request with Northwest Indiana Regional Development Authority (RDA).

IN: Fort Wayne Arena

Proposed west of the Grand Wayne Convention Center. Feasibility studies under way.

Capacity 4,500-6,000
Cost US\$63m

KS, Hutchinson Arena

Renovation to sports arena built in 1962 to keep the National Junior College Athletic Association men's national championship basketball tournament for 25 years. More upper-level seating for people with disabilities, undersized practice gymnasium into new home team locker rooms, renovating an existing sports medicine area and weight room into meeting or hospitality space, upgrading heating, plumbing and electrical systems and adding air conditioning to the seating bowl. New main entrance and lobby, concession stands, more restrooms, elevators to reach the upper level, and office and meeting space. Two full-size practice gyms, a new weight room and mechanical and storage space. Architect: Sink Combs Dethlef (Chris Kastelic).

Cost US\$29m

MA, Cambridge: Harvard Multipurpose Arena

New mixed-use facility and basketball venue on the North Harvard Street site of the old Ed Portal. To replace Lavietes Pavilion (2,195). To include graduate housing and ground-floor retail space.

Capacity 3,200
Completion 2020-2024

MD: Baltimore Arena

Various proposals from developers to replace 45-year-old 1st Mariner Arena. Private funding interest from Whiting-Turner. Likely to extend convention center, and add arena. Also suggested for Inner Harbor. Research phase. Maryland Stadium Authority centre suggested a 18,500-seat arena with no major league basketball or hockey franchise, 500-room hotel to create a destination package. Arena income projection: \$48.1m-\$50.3m annually. Arena jobs: 730-760. Parking: 500

Capacity 18,500
Cost US\$900m

MD, Baltimore County: UMBC Arena

University of Maryland, Baltimore County (Joe Rexing, director of facilities management) is replacing Retriever Activities Center (1973), home of the men's and women's basketball and volleyball teams. New events and convocation center on campus near the present site of the UMBC Stadium and baseball's Alumni Field and softball stadium, will host sports and community events. University architect: Joe Rexing. Area: 170,000ft².

Capacity 5,000
Cost US\$67m
Completion 2017

ME: Bowdoin University Arena

University's future building plans include a new hockey arena. Masterplan: Doug Voigt of Skidmore, Owings and Merrill.

ME, Portland: Forefront Arena

Arena/convention centre as part of the Forefront development at Thompson's Point. Tenant: Maine Red Claws pro basketball team. Tax breaks under discussion.

Cost US\$100m (total development)

MI, Detroit: Little Caesar's Arena

New hockey arena for the Red Wings and 45-block entertainment district driven by Downtown Development Authority. Opened in September. Replaces Joe Louis Arena (20,058), fourth oldest NHL venue. Gondola seating, public plaza with screen, practice and amateur hockey areas. Finance: \$284.5m in property taxes, the rest from developer Olympia Development (Steve Marquardt). Owner: city. Operator: Olympia. Construction: JV Barton Malow, Hunt Construction Group and White Construction. Steel parts: 2,400. Concrete: 45,000 yds³. Detroit Employment Solutions Corp. to develop training programmes to get Detroit residents ready to take construction jobs. Jobs: 5,500 (1,100 permanent). Event space: 650,000ft².

Capacity 20,000
Cost US\$627m (\$450m) (+\$200m other development)
Completion September 2017

MI: Kalamazoo Arena

Proposed downtown arena for WMU and the Kalamazoo Wings as part of mixed use development. Early community meetings taking place. Architect: Eckert Wordell Architecture, Engineering and Interior Design (Jason B. Novotny). Area: 215,000ft².

Capacity 6,800
Cost US\$82m

MN: Crookston Arena

Developer: Crookston Civic Arena, LLC. Construction: Donlar Construction.

MN, Minneapolis: Target Center



Agreement between city's economic development department, Timberwolves, Lynx and AEG to take the arena through to 2032 in 'as new'. The exact construction dates are not yet known, but a timeline of the \$129m renovation project has been released. Phase 1 Summer 2016: Suite Level, Scoreboard, Acoustic Improvements. Phase 2 Autumn/Fall 2016-Spring 2017: Exterior Work Begin, Loading Dock, Marshalling Yard. Phase 3 Summer 2017: New Lobby Built, Locker Rooms, Dressing Rooms, Public Restrooms, Concourse Improvements, Additional Club Spaces, Food and Beverage Improvements. The venue will remain open for the first two phases of construction and then will close down during the summer of 2017 to allow major construction to finish. Finance: Minneapolis \$48.5m, Timberwolves and Lynx \$43m, AEG Facilities \$5.5m. Jobs: 200 full-time, 700 part-time. Incremental annual income: \$100m. Events: 200.

Mechanical Engineer ME Engineers

ME is providing MEP and technology design.

Cost US\$129m
Completion 2017

MS: Jackson Arena

Study commissioned by Downtown Jackson Partners and the Central Mississippi Planning and Development District. Consultant: Populous (Russ Simons).

Capacity 15,000-18,000
Cost US\$100m

NC, Charlotte: Time Warner Cable Arena

Updates to keep the arena competitive and to bid on hosting the 2017 and 2018 NBA All-Star Games. Home of Charlotte Hornets. Restaurant renovations, bathroom improvements, new lighting, visitor locker room upgrades, moving the ticket office and scoreboard improvements, lower bowl reconfigure +600. Finance: city. Owner: city. Operator: Charlotte Bobcats.

Cost US\$27.5 (US\$44m)

NC, Charleston: Carolina First Center

North Carolina Center for Health & Wellness and multipurpose convocation centre, Kimmel Arena at College of Charleston. For intercollegiate basketball teams and student health and recreational programmes. Architect: Betsch Associates. Area: 270,000ft². Finance: Naming gift \$2m and college budget.

Capacity 5,000
Cost US\$35m

NC, Elon: Schar Center

For Elon University. Fourth biggest arena in the CAA.

Capacity 5,400
Completion 2018

NC, High Point: University Basketball Arena

High Point University (HPU) plans to build a \$100m basketball arena, conference centre and hotel. The new building will become the home of HPU's men's and women's basketball programs, as well as a venue for major events, speakers, concerts, entertainment, academic symposia, and recreational activities. The 4,500 seat arena will include suites, locker rooms, staff offices, concession stands and a merchandising area. There will also be a media suite, film room, press conference room, weight room, athletic training room, hospitality area, high tech audio and video equipment, ticket office and practice gym. There will be 2,500 conference centre seats and a small, executive hotel will be located adjacent to the conference centre to support a proposed hospitality management programme. The university is selecting a site location from several campus-owned possibilities as architects finalise plans. Construction will begin during the 2018-2019 academic year.

Capacity 4,500
Cost US\$100m

ND, Jamestown: UoJ Arena

Basketball court on the east side of the Larson Center at University of Jamestown. Finance: donation – Harold Newman.

Capacity 2,200
Cost US\$16m

NJ: Monmouth University MAC

Multi-Activity Center of 152,400ft². Anchor arena. Architect: Ewing Cole Cherry Britt.

Capacity 4,800

NV, Las Vegas: All Net Arena

All Net Arena and Resort nongaming hotel project on the former Wet 'n Wild site (total project cost \$1.4bn). Needs development agreement with Clark County. Developer: Jackie Robinson. Could be the first ever arena with a retractable roof. Architect: Cuninghame Group (Brett Ewing). Consulting: HKS, Walter P. Moore and Uni-Systems.

Capacity 22,000
Cost US\$690m
Completion 2017

NV, Henderson: Silver State Arena

Proposed as part of the planned Las Vegas National Sports Complex in Henderson on a 485-acre site in West Henderson. Finance: International Development Management and China Security & Surveillance Technology.

Cost US\$650m

NY, Le Ray: Mall Arena

Proposed multi-purpose arena near Fort Drum's main gate off Route 11 in LeRay. Destination element in 600,000ft² outlet mall.

NY, Long Island: Nassau Veterans Memorial Coliseum

Venue has reopened after a \$165 million renovation project. The Coliseum will be home to the Brooklyn Nets' NBA Development League affiliate, the Long Island Nets, and will also host a variety of events including concerts, family shows, sports and outdoor festivals. Guest enhancements include a new exterior glass storefront to infuse natural light into the refreshed concourse, a redesigned main entrance, all new seating, improved bowl circulation, and revamped bathrooms and concessions. New amenity spaces for fans include an event level VIP Club and The Blue Moon Beer Garden. Developer: Nassau Events Center plc. Events: 300.

Completion 2017

OH, Cincinnati: Fifth Third Arena

Renovation of the Bearcats' basketball arena at University of Cincinnati – UC architect Beth McGrew, University of Cincinnati department of Planning, Design and Construction. Interior and exterior of the 26-year-old facility to receive a new look. A 360-degree seating bowl, adding more comfortable seats and better spectator sight lines. Permanent seating to replace rollaway bleachers. East plaza will be renovated with a new main entrance, centralised ticketing and guest services. New luxury suites, bathrooms and concession areas will be added. The arena will get a new fan lounge and sound system, in addition to upgraded locker rooms. Contractor: Skanska and Megan Construction (\$70m). Upgrades to restrooms, HVAC, lighting, A/V, fire protection systems. Athletic Director Mike Bohn. Architect: Populous.

Capacity 11,500 (13,176)
Cost US\$87m
Completion November 2018

OH, Cincinnati: US Bank Arena

Proposed extensive renovations. Owner: Nederlander Entertainment (CEO Ray Harris). Operator: AEG Facilities. Seeking some public contribution with support of city, Hamilton County, and regional tourism leaders. Modernising interior and exterior, expanding venue seating. The 40-year-old arena has not undergone a major renovation since 1997. Multiple points of entry, new façade, continuous walkable concourse around the arena's base, which will connect the plaza level to the riverfront and The Banks. Better locker rooms to attract collegiate sports programming. Escalators and elevators, exterior video boards and freestanding video signage elements. Suites: 40-60, new level closer to stage. Club seats: 1,750. Project design: MSA Architects.

Capacity 18,500
Cost US\$200m-US\$250m



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OH: Columbus: Covelli Multi-Sport Arena

On North Campus to host competitions for six of Ohio State University's sports programmes. Combined with Jennings Family Wrestling Practice Facility. Finance: \$10m donation (Covelli).

Capacity	3,700
Cost	US\$49m
Completion	2019

OH: University of Dayton

University of Dayton Arena to undergo a \$72 million renovation in three phases from 2017 to 2019. Phase 1 from 2017-2018 will include: Upgrade courtside and press seating areas; New four-sided, center-hung video board; New LED ribbon boards on the fascia of Spectrum Flight Deck and suites; Move TV broadcast area from Southeast to Northeast corner of Arena; Upgrade Arena bowl audio system and broadcast infrastructure. Phase 2 from 2018-2019 includes: New concourse and 300/400 level seats; New Southside and Westside entrance and elevator and stairs to event level; New renovated event level locker rooms and training room. Phase 3 from 2019-2020 covers: New concourse and 300/400 level seats; New Club Seats between 200/300 levels and addition of concourse clubs; New four-corner Terrace Suites; Complete 360-degree concourse renovation with updated finishes and branding.

OH: Dayton Arena

Proposed for Dayton Bombers hockey team and community teams and skating.

Capacity	5,500
Cost	US\$30m

OH, Columbus: Schottenstein Center

The board of trustees has approved renovations to the home of the basketball and ice hockey teams. Expanded concourse and add more natural light to the building, improved access to ticket offices and team store.

Cost	US\$31.5m
Completion	February 2018

OR, Portland: Viking Pavilion and Ed Center

Massive renovation of the Peter W. Stott Center, Portland State University, which has served as a health, physical education and athletics facility since it was built in 1966. For public events, including lectures, concerts and athletic events, including PSU basketball games. Finance: OHSU \$7.5m, state bonds \$24m, donation \$5m. Study space: 30,000ft². Contractor: Fortis Construction (\$32m).

Capacity	3,100
Cost	US\$45m
Completion	Q1 2018

PA, Philadelphia: Villanova Basketball Arena

The Villanova University Board of Trustees has formally approved a comprehensive renovation plan for the 31-year-old Pavilion basketball arena on Villanova's campus. The significant renovation, which will be funded entirely by donor support, will transform the existing Pavilion—creating a high-quality, game-day experience for Villanova students, faculty, staff, alumni and fans. The renovation of the Pavilion is scheduled to begin in June 2017. The arena will officially be named the Finneran Pavilion when it is reopened.

Cost	US\$60m
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SC, Charleston: North Charleston Coliseum

Proposed upgrades to keep the 12,000-seat arena modern and competitive for at least the next 15 to 20 years. Two easy-access food courts on opposite sides of the building. Deeper and larger suites, a new arena bowl sound system and the addition of catwalks with wider platforms, which would allow for expanded rigging capabilities and spotlighting events.

Cost	US\$19m
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SC, Spartanburg: Jerry Richardson Arena

Home for Wolford College's basketball and volleyball teams in separate arenas. It will include locker rooms, coaches offices, meeting rooms, a video scoreboard and ribbon board. Construction manager: Robins & Morton. Athletic Director: Richard Johnson. 3,400 basketball, 500 (volleyball), 4,500 (non-athletics)

Capacity	4,500, 3,400 (basketball)
Completion	Q3 2017

SD, Madison: Bahn Arena

Hockey practice arena adjacent to the Kohl Center for University of Madison-Wisconsin hockey teams. Concrete and steel construction, precast tiers. Ice system mechanical room is complete and the underfloor mechanical, electrical and plumbing installations are continuing. Women's hockey coaches offices, swim team lounge, hockey locker rooms.

Cost	US\$27.7m
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TN, Nashville: Bridgestone Arena



Nashville Predators have initiated a conversation with the Metro Sports Authority around the opportunities for development and enhancements. Possibilities include: a second sheet of ice on site, new event plazas, a hospitality tower housing a hotel, office and residential space, new team and facility offices, a conference center and hospitality and retail offerings; inside: wider concourses, new seating options and increased amenities at all levels.

TN: University of Memphis Center

Student recreation and fitness centre. Area: 192,500ft² along Southern Avenue. Four-court divisible gym, two-court gym, multi-purpose fitness centre with climbing wall, six racquetball courts, a quarter-mile indoor track, a lane pool, a recreational pool, an outdoor leisure pool, training facilities, large group exercise areas, classrooms, offices, a juice bar and a wellness and nutrition area. Three full-size turf fields, basketball and tennis courts will make up the outdoor component of the center. Three phases of construction. Finance: student fee increase.

Cost	US\$62m
Completion	2018

TX, Austin: University of Texas

The next home for Longhorns basketball at the University of Texas at Austin will be a new, on-campus arena easily accessible to student-athletes and fans. UT at Austin is considering a plan to build the arena south of Mike A. Myers track stadium but has not yet determined the precise footprint, scope or cost of the facility, which will replace the Frank Erwin Center in the next five to seven years.

TX, Dallas: Robson & Lindley Aquatics Center

Robson & Lindley Aquatics Center/Barr-McMillion Natatorium as part of Phase 1 of Southern Methodist University Athletics' Facilities Master Plan. A new 42,000-square-foot facility that will feature an Olympic-sized, eight-lane indoor pool with a platform diving area, four springboards, a 10-meter tower, coaches offices, locker rooms and a classroom and meeting area. In partnership with AT&T and the city of Dallas,

Mechanical Engineer	ME Engineers
ME is providing MEP and technology design.	

TX, Edinburg: Bert Ogden Arena

Publicly-owned basketball arena for the Rio Grande Valley Vipers near Interstate 69C/Expressway 281 and Alberta Road. City of Edinburg and Vipers have signed memorandum of understanding. Four month timetable to contract. Basketball-specific for great fan experience. Screen: 40x20ft. Restaurant, lounges, suites, concessions. Jobs: 150. Finance: Vipers \$25m, city \$30m (special tax zone). Annual rent \$350,000, 30-year lease. Investment group will donate land to a city-established corporation before construction begins. Design and build: Cantu Construction and Development Company.

Capacity	8,500
Cost	US\$68m (\$55m)
Completion	October 2017

TX: El Paso Arena

Council has chosen to acquire 12-acre site south of the El Paso Convention Center for multipurpose arena. Consultants: HKS Urban Design Studio, International Facilities Group (\$4.8m). Events: 120. Finance: public and private \$60-\$70m.

Capacity	12,750
Cost	US\$180m
Completion	early 2020

TX: Fort Worth Arena

Voters approved taxes towards a new multipurpose arena adjacent to the Will Rogers Memorial Center. Land purchase under way. Finance: city half, private donors led by businessman Ed Bass half. Events: annual Stock Show Rodeo, equestrian and livestock events, concerts, sporting events and family shows. Operator: Event Facilities Fort Worth (not-for-profit) - 30years, 4 x 10-year options. Finance: bonds and reserves.

Capacity	15,000
Cost	US\$450m
Completion	December 2019

TX, Huntsville: Propst Arena

Makeover of the Von Braun Center. Construction manager: Jeffords Associates. Construction: Vratsinas Construction. Finance: City and \$5m donation (Propst).

Cost	US\$24.5m
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TX, Irving: Entertainment Center

Re-start of public/private project in Las Colinas, 18 acre "Music Factory" project. 100,000ft² amphitheatre. Operator: Live Nation. Developer: ARK Group (Noah Lazes). Construction: Skanska.

Capacity	8,000
Cost	US\$165m
Completion	June 2017

UT, Salt Lake City: Vivint Smart Home Arena

The home of the NBA's Utah Jazz has re-opened in Salt Lake City after a \$125 million upgrade project. The plaza greets people with a supersized J-note as the centerpiece, while a new 12,000ft² America First Credit Union atrium has been added with a 76ft long video screen on top of the foyer for outdoor watch parties. Another substantial upgrade for the arena is the formation of the Toyota Club with gathering space for 1,700 guests. Located on level two behind the lower bowl seats, the club wraps around nearly two-thirds of the arena. The open floor layout has comfortable social spaces for a quick bite to eat or a full-service meal from an array of live cooking stations and new restaurant offerings.

The club is open throughout Jazz games with eight portal entrances along with a members only main entry from the arena lobby.

The WCF Insurance Club and the Silicon Slopes Club are additional speciality spaces that have been remodeled. With its top-to-bottom approach for improvements and desire to implement sustainable practices, the renovation started on the roof with the installation of 2,700 Vivint Solar panels, covering 80,000ft² and producing the energy equivalency worth two seasons of Jazz home games.

The Jazz players also have a new home away from home with the remodeling of the locker room complex and the addition of weight rooms, training rooms and family areas on level one.

Technology has also been deployed to enhance the guest experience through a new mobile app, high-speed public Wi-Fi, cloud-based technology and predictive analytics. Architect: Brisbin Brook Beynon and SCI Architects (Murray Beynon).

Mechanical Engineer	ME Engineers
ME is providing MEP, A/V, security, and other technology systems design.	

Cost	US\$125m
Completion	fall 2017



VA: Richmond Arena

Proposed new arena and redevelopment of the existing Coliseum site. Big enough to attract minor league hockey, professional women's basketball, and early-round NCAA men's basketball tournaments plus concerts. Consulting team: Barrett Sports Group, Populous, Weston Sports & Entertainment.

Capacity 15,000

VA: Virginia Beach Arena

Plans for unnamed NBA or NHL team to re-locate to Virginia Beach. City council requires workable financial plan from the developer. Proposed sports authority and multi-purpose sports and entertainment venue. VB permitted to issue bonds for finance. Jobs: 3,944 during construction, 55 permanent and 322 part-time employees post-construction. Developer group: United States Management. Finance: private (city to pay for infrastructure).

Capacity 18,500

Cost US\$210m

VT, Burlington: UVM Multipurpose Arena

Both Burlington and South Burlington would like to have a long-anticipated multi-purpose arena that would host the University of Vermont hockey and basketball teams. South Burlington and UVM: replacement of the University Mall or the Rick Marcotte Central School. Burlington: new arena on Main Street at the current site of Memorial Auditorium. Reports commissioned, decision expected early 2017. Events: 60.

Cost US\$50-60m

WA, Tukwila: Northwest Arena

Proposal for an NBA and NHL arena just south of I-405 and near the Green River adjacent to the Sounder commuter rail station. Consulting stage, renderings issued. Area: 195,000ft². Height: 140ft. Green: LEED Silver. Ownership group: Russell Group.

Capacity 17,500

WI, Ashwauberon: Brown County Veterans Memorial Arena

County considering renovation or reconstruction of 60-year-old arena that stands in the shadow of Lambeau Field.

WI: Milwaukee: Bucks Arena

Wisconsin State Assembly voted to approve a bill that will earmark \$250 million in public money to help fund the construction of a new downtown arena for Milwaukee Bucks. Intimate basketball experience with majority of seating in lower bowl, but also support for loading in and out a variety of event types. BMO Harris Bradley Center unsuitable for NBA team and new arena required to begin by November 2017. Just north of the BMO Harris Bradley Center. Area: 714,000ft². Plaza: 60,000ft². Also, state-of-the-art practice facility as soon as possible on Park East land just east of The Brewery development. Metropolitan Milwaukee Association of Commerce hired Hammes Co. to provide advice on whether a new, multipurpose sports arena should be built, or whether the BMO Harris Bradley Center should be renovated. Bucks' lease ends 2017 and NBA wants arena to league standards by then. Demolition of the Bradley Center for hotel and additional commercial or office space. Architect: Populous, HNTB and Eppstein Uhen. Finance: .Finance: owners \$250m, public \$250m.

Mechanical Engineer ME Engineers

ME is providing MEP, technology and lighting design.

Capacity 17,000

Cost US\$500m

Completion 2018

WI, Milwaukee: Marquette University Sports Center

University refining design concepts and budget for athletic performance research centre. Study: Cannon. The centre will provide locker rooms and office space for several athletic programs and combine indoor playing fields for Marquette's lacrosse and soccer programs. It will also feature an indoor track and a world-class athletic performance research facility. Architect: Sink Combs Dethlefs.

Mechanical Engineer ME Engineers

ME is providing full MEP design.

WY: University of Wyoming Arena

Two-phase renovation for Arena-Auditorium. Phase one complete. Phase two includes new grand entrance to the Arena on the east side of the building, the creation of a new ticket office to serve Cowboy and Cowgirl fans, Club Area, UW Intercollegiate Athletics Hall of Fame and renovation of concession and rest room areas. Club seats: 500. Separate high altitude performance centre approved next to Rochelle Athletics Center (design: Lime Green Design). Finance: 36 private donors \$10m, Wyoming State \$15m. Construction (phase two): Sletten Construction (\$13.28m).

Cost US\$30m

Completion October 2017

Milwaukee Bucks Arena



YOUR NEXT ISSUE

PS&AM 2ND QUARTER ADVERTISERS' INDEX

AECOM	7
ALSD	75
Arena Group	95
BMT Fluid Mechanics	33
Bosch Rexroth AG	21 & 87
ColosseoEAS, a.s.	63
d&b audiotechnik	45
Daktronics UK	67
Dallmeier electronic GmbH & Co.KG	131
Green Sports Alliance	109
HARMAN Professional Solutions	53
Iowa Rotocast Plastics	59
L Acoustics	47
Low & Bonar	IBC
ME Engineers	13
Meyer Sound	49
Mott MacDonald	11
Musco Lighting Inc	69
NEXO SA	43
Olympic Park	35
OSRAM	15
Schmitz Foam Products	BC
Signature Systems Group	83
SKIDATA AG	91
SMG Sportplatzmaschinebau	77
Stadia & Arena Japan 2018	39 80&81
Terraplas	79 & 85
TW AUDIO GmbH	IFC
Unitech System Co. Ltd	5
Walter P Moore	103



The next edition of *PanStadia & Arena Management* magazine, our 3rd quarter (Q3) 2018 issue will include:

VENUE IN FOCUS

- ▶ **Tottenham Hotspur FC's new stadium in London**
- ▶ **Wisconsin Sports & Entertainment Center, Milwaukee**, new home of the NBA's Milwaukee Bucks

FEATURES

- ▶ **A round up of US collegiate** and minor league projects currently on the boards
- ▶ **Design Spotlight** – best practice examples of multi- purpose sports venues from around the globe
- ▶ **Smarter Tools for Smarter Stadia** – the growing use of BIM and Virtual Reality in the AEC process
- ▶ **The growing importance of design** in sports venue hospitality
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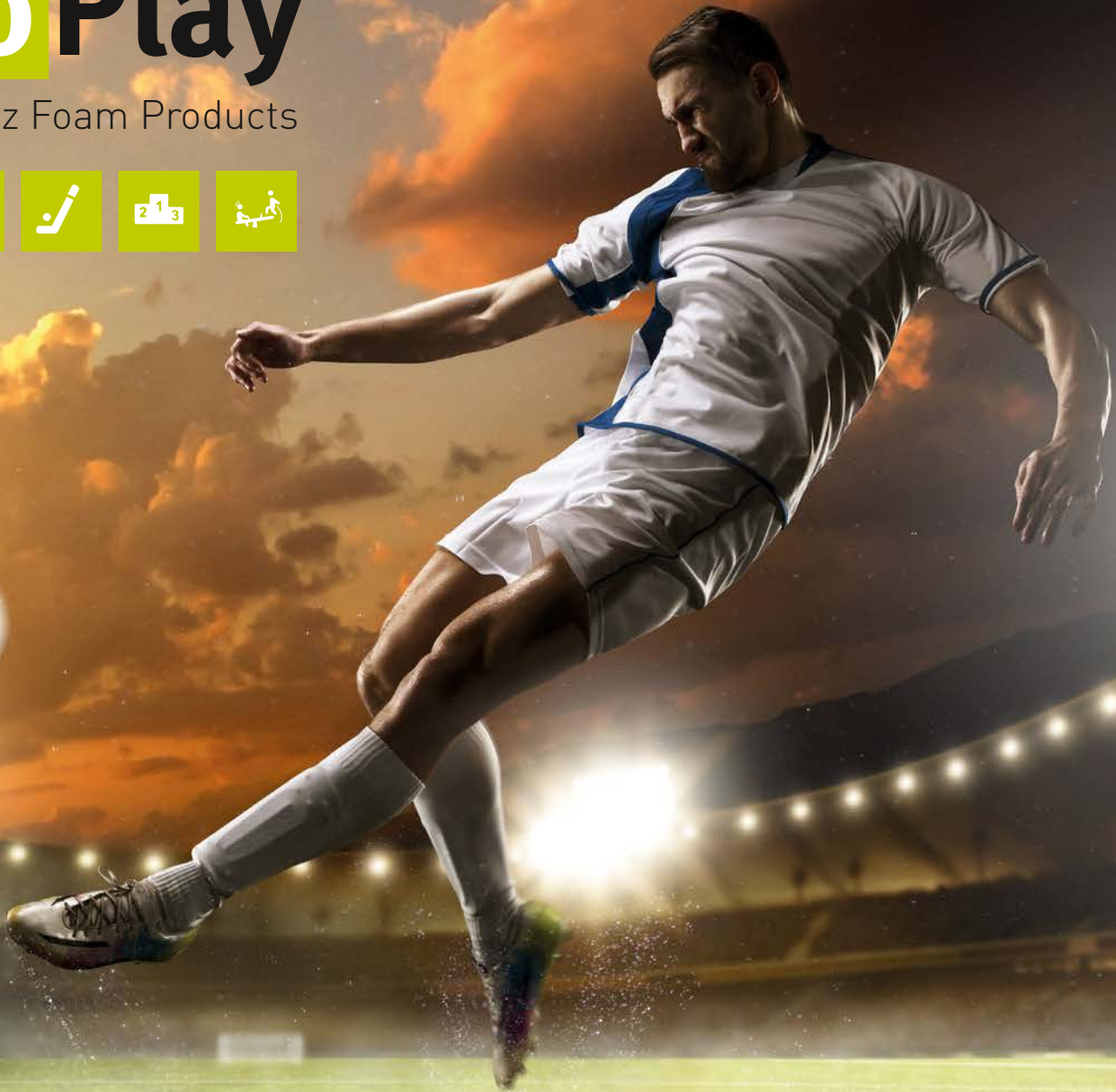
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