MOTT MACDONALD

Delivering events, creating memories

Event overlay planning and design services

Temporary infrastructure, lasting value

Innovative overlay solutions to excite communities, inspire athletes and amaze spectators

Sustainable and fit for purpose

Worldwide there is a growing need to make the process of bidding for and hosting events more flexible, easier to manage and less expensive. There is also a recognition that legacy planning needs to align better with the host city's long-term urban development goals.

Previous high-profile events have not always looked beyond the immediate needs of the games, leaving permanent buildings and infrastructure that are oversized or for which there is no identified demand. This has resulted in rights holders and host cities taking a closer look at areas where reduction or rationalisation is possible without compromising the event or stakeholder experience.

Through the use of temporary infrastructure to host the event, a vibrant legacy of regeneration can still be delivered.

Overlay – the design, planning, installation and removal of the temporary infrastructure and services needed to deliver major one-off events – is increasingly playing a key role in this drive for sustainability.

Unique structures, standardised components

Demand for temporary infrastructure has grown rapidly to meet media, security, logistics, hospitality and fan needs and expectations.

Overlay delivery doesn't involve construction in the conventional sense. Much of it is about getting standardised building components – whether that's toilet blocks, temporary power, broadcast trailers or whole buildings – in the right numbers, in the best configuration, and in the optimum place to meet needs.

Even landmark buildings and arenas that will stir excitement in a city, inspire athletes and deliver amazing spectator experiences can be created using standardised components, most of which can be sourced from the rental market.

The skill of the overlay designer is to embrace everything temporary and create a bespoke assembly that is just as eye-catching as a permanent venue but formed from off-the-shelf rental commodities with a small element of new.

High residual value

By avoiding one-off solutions, and instead creatively bringing together standardised components to build facilities, a high residual value and demand for the component parts beyond the games or event are generated. Overlay also involves the use of modular fields of play and maximising opportunities for venue sharing.

Other measures include optimising the power infrastructure in terms of legacy and sustainability opportunities, and more effectively combining the use of event-specific transport resources and the existing public transport network.

Reduced, recoverable, reusable, recyclable

Overlay is an evolving industry but for Mott MacDonald its principles are simple: Wherever possible you design and build using standardised modules that can be hired. Where hire isn't possible, you design using elements that can be recovered and sold on. The temporary nature of an overlay solution often means fewer materials are required to deliver the event compared with a permanent building.

Speed and cost are key criteria for both construction and disassembly. Connections must be easy to make and undo; the amount of digging, for example for foundations and pipe laying, has to be reduced.

Minimal environmental impact

Many of our temporary venues have no traditional foundations at all, instead we simply manage the settlements over the life of the venue. Our overlay components touch the ground lightly and are designed for reuse, hence minimise their time and cost to deliver, but also their environmental impact on the legacy site.

Lastly, components need to be robust enough to withstand lots of manual handling so that they retain their value when returned to the hirer, to the retail market, or relocated to support a future event.

These are the principles we follow when planning and designing sustainable, cost-effective overlay solutions for events across the globe.

How we can help you:

Our range of overlay planning and design services:

- Bid book stage overlay planning
- Integrated games planning and delivery
- Overlay specification, cost plans and procurement
- Overlay design
- Venue rationalisation studies
- Temporary/demountable structures
- Building information modelling to plan/deliver overlay
- Temporary power
- Operational transport

How we add value through digital innovation

Letting the computer take the strain
Drawing on our experience helping to deliver London 2012 and Glasgow 2014, we developed Optimum, a software tool designed to improve inter-agency co-ordination during the planning of major events.

Used from the bid stage, it brings information from different teams together in a GIS database from which can be created a time-sequenced 3D model for integrated planning purposes.

Ground-level 'fly-through' visualisations support testing and readiness exercises to ensure the smooth operation of the whole event and that the end-to-end spectator experience fits in with the organiser's aspirations.

The most recent deployment of the tool was in support of Birmingham's successful bid to host the 2022 Commonwealth Games.

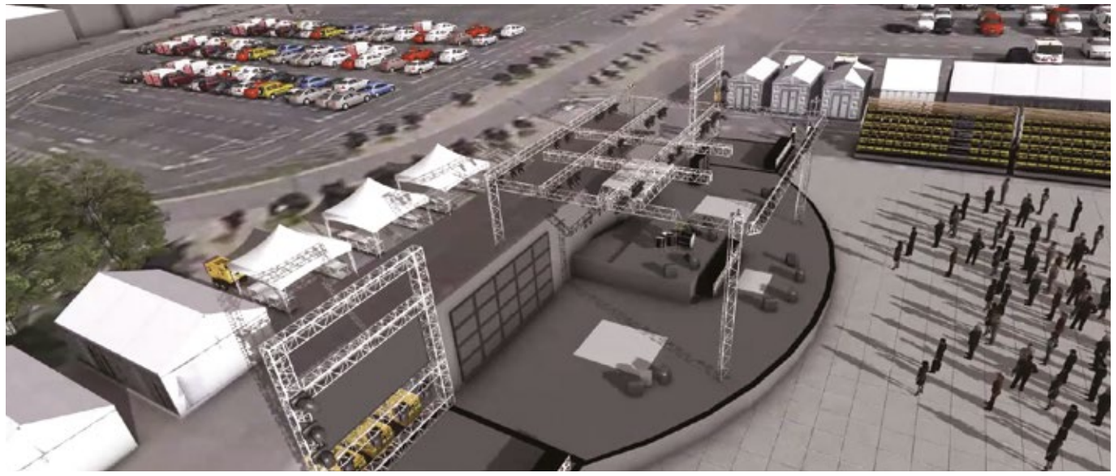
Getting things right first time, every time
Through the creation of a digital twin of the facilities that will be delivered during the event or games, we can virtually assemble, test and commission the venue a long time before it is ever built.

We are able to do this using building information modelling (BIM) and we were among the first to apply BIM to the design of sports overlay, an industry-changing idea that is saving time and money for event organisers around the world.

BIM can be utilised to design low-cost temporary venues with redeployable architecture that can be disassembled and the components reused once the event is over.

Our BIM library contains many thousands of standardised virtual components that can be used to create temporary infrastructure with 'drag and drop' ease. It is a unique database that defines not just what assets go into an overlay, but how many of each kind of asset is needed to meet an event's requirements in the most expedient and efficient way.

Realistic visualisation
Optimum has been developed to aid the integrated planning of major events



10 sustainability rules for event overlay

1.
Reduce – pursue compact designs and better performance from energy and materials

2.
Prolong the useful life of materials and structures

3.
Reuse existing materials and use recycled or renewable resources

4.
Don't use materials harmful to health

5.
Touch the ground lightly – reduce or remove traditional foundations through performance engineering

6.
Reduce carbon emissions, minimise energy use and conserve water

7.
Use natural systems to achieve energy efficiency and thermal, acoustic and lighting comfort, and to create healthy, pollution-free indoor environments

8.
Maximise use of renewable energy

9.
Minimise earth-moving activity

10.
Maximise the residual value of the venues and individual components to encourage reuse and resale opportunities after the games

Temporary venue leaves permanent legacy

We were appointed to carry out structural and civil engineering reviews and provide a site-based contractor supervisor role for the temporary overlay facilities at Eton Manor, the only dedicated Paralympics venue within the London 2012 Olympic Park.

With temporary seating for 10,500 spectators, it hosted the wheelchair tennis events at the games. It also provided a temporary pools enclosure housing three Olympic-sized swimming pools, a diving pool, a water polo pool, and aquatic training and changing facilities.

During London 2012 the tennis hall was fitted out for use by the International Olympic Committee as an administration centre including office accommodation, meeting rooms and reception areas.

Post-event Eton Manor was transformed into the Lee Valley Hockey and Tennis Centre. Today it combines community and elite use, catering for players competing at international level, to clubs, schools, enthusiasts and people new to both sports.

Project
Eton Manor

Location
London, UK

Client
LOCOG

Project
Rio 2016 Olympic and Paralympic Games

Location
Rio de Janeiro, Brazil

Client
Organising Committee for Rio 2016

BIM keeps Olympics on schedule

For Rio 2016 our consortium had just six months to design US$500M worth of temporary power, water, wastewater and drainage infrastructure for 55 sites. We introduced building information modelling (BIM) to provide the clarity, speed, flexibility and accuracy the project demanded.

Site layouts were in a state of flux during the early stages of the programme and designs had to be reconfigured up to five times. Our BIM working methods allowed changes to the overlay design to be accommodated quickly and easily.

A bespoke, in-house database of commonly used overlay assets allowed us to rapidly develop overlay drawings for venues, while providing accurate quantity and capacity requirements for overlay equipment, such as generators, uninterruptible power supply systems, distribution boards, cabling, water storage, sanitation, fire extinguishers and containment sizing.

Our team also developed the broadcast lighting, temporary lighting and other rigging solutions, as well as providing logistics and scheduling support.

We used an automated overlay system that enabled our drawings and schedules to be updated when new objects were placed on the layout plans – this facilitated rapid and easy changes to a venue's overlay plan while utilising standardised components.

With designs flowing from our design team six times faster than industry standard, our team provided fast-track procurement of infrastructure, while also finding cost savings of up to 20% on capital-intensive overlay, such as power generation and water supply.

Project
Asian Games 2018

Location
Jakarta, Indonesia

Client
ES Global/Asian Games 2018 Organising Committee

London to Jakarta in half the time

50%
time saved on construction

Fresh thinking was needed when Jakarta, host city of the 18th Asian Games, approached us to advise on the viability of delivering a new permanent velodrome facility to host track cycling events.

There was a relatively low budget available, while the authorities only had half the time typically required to tender, design, procure and build a velodrome.

Working in partnership with contractors ES Global and Wika and architects Cox Architecture and BKM, we demonstrated that a permanent velodrome building could be delivered within the time and budget by using a temporary venue design and delivery approach.

Prefabricated structural components, previously used on the water polo and shooting venues for London 2012, were re-engineered so they could be deployed on a permanent-use building in a seismic zone.

A world-class cycling track, housed in a humidity-conditioned environment to provide both track longevity and comfort for 3000 spectators, was delivered on budget and in 50% less time than typically achieved. Moreover, the facility is costing less than many naturally ventilated venues.

Image: © Cox Architecture

Project
TORONTO 2015 Pan Am/ Parapan Am Games

Location
Toronto, Canada

Client
TORONTO 2015 Pan Am/Parapan Am Games Organizing Committee

15
number of venues

Database is a game-changer

"We appreciate the contribution Mott MacDonald has made in what has been a great Pan Am Games. Thank you for the support and partnership throughout the project."

John Baker
Vice-president – overlay and broadcast integration, TORONTO 2015

We were the temporary power, sports lighting, internal build-out and overlay delivery consultants for the TORONTO 2015 Pan Am/Parapan Am Games, the largest multisport event ever hosted in Canada.

This included overseeing the installation of temporary overlay power, providing games-time support, and designing temporary sports lighting solutions to meet broadcast and sports federation requirements at 15 key venues, including the shooting range which we designed and engineered.

At TORONTO 2015, recognising the commonalities in various types of overlay assets – and the potential for standardisation and reuse of components, with the associated cost benefits – we developed a BIM database of portable assets that could be dismantled and then reassembled at new locations.

This database has since formed the basis of our overlay solutions for Rio 2016 and other major international multisport events.

World-class venue on target

Organisers of London 2012 wanted a shooting venue that was low-cost but world-class, temporary but distinctive. In an Olympic-first, we worked with the organiser to reschedule the qualifying rounds by staggering events.

This allowed us to create a single transformable range for two of the four shooting disciplines, cutting the venue footprint and cost by 25%.

The structural frame used standard, rented steel trusses and columns, covered inside and out with recyclable PVC fabric. Foundations were lengths of reclaimed oil pipeline. Steel rings mounted on lightweight frames, braced off the primary structure, tensioned the fabric by pulling and pushing it out of plane, giving the façade its distinctive ‘bullet hole’ aesthetic.

We utilised the form of the building to provide a naturally ventilated facility, using advanced modelling techniques to keep the internal air temperature no more than 2°C above ambient (and less than outside operative). Not only were the buildings non-permanent, we also provided the complete temporary overlay including stormwater retention, broadcast cabling containment, power, lighting rigging and water supply.

Compared to conventional tensioning, our method halved the cost of the envelope. The rings created apertures for natural ventilation; the fabric’s translucency minimised artificial lighting, keeping building operating costs low.

Our client allowed 18 months for construction, but using BIM we worked with the main contractor to rehearse construction. Including a two-month ‘buffer’, the venue was completed in six months. After use, the structure was dismantled and its components used to build the shooting venue for the 2014 Commonwealth Games in Glasgow.

Project
London 2012 Olympic and Paralympic shooting ranges

Location
London, UK

Client
LOCOG

Project
Glasgow 2014 Commonwealth Games

Location
Glasgow, UK

Client
Glasgow 2014 Commonwealth Games Organising Committee

Same venue used for two major games

At Glasgow 2014 we were responsible for the complete design of the 10m, 25m and 50m shooting range venues, together with the high/low houses for the skeet and clay pigeon shooting events.

The key challenge was to reuse components from the £35M shooting venue used for the London 2012 Olympics to build a Commonwealth Games venue for only £3M.

As the lead consultant for all design services we had to negotiate tight fees with our supply chain of architects, ballistic consultants, planning consultants and in-house teams, and manage their contracts to successfully deliver on programme and within budget.

As well as being a significant logistical, planning and project management challenge against an immovable deadline, the project represented a considerable technical challenge, involving redeployment and strengthening of components originally designed for a different configuration and wind loads.

This was the first time that a venue has been reused from one major games to another, and was made possible by the intelligent use of rental components in our original London 2012 design.

£3M
affordable cost of venue

“Highly proactive and motivated to make the project a lasting success. Your invaluable experience and pragmatic advice informed major decisions and contributed to significant efficiencies.”

Greg Smith
Project sponsor, Olympic Legacy Transformation

Opening opportunities with connected thinking.

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