LONDON GAMES – FROM CONSTRUCTION TO COMMISSIONING

Report of seminar 165 held on 2nd November 2011 at No 4 Hamilton Place, London

SUMMARY
KEY CONCLUSIONS

• In leading major programmes, clients can provide clarity by outlining a few messages regarding desired outcomes, e.g. only four themes were used to cover legacy requirements.

• Sometimes there is not enough time to gain all the necessary data or agreements, therefore senior managers were encouraged to ‘ask for forgiveness not permission’.

• The sustainability agenda was condensed into six priority themes. All strategy documents stated what the client wanted to achieve and what was not being sought. This was important in briefing suppliers and critical external stakeholders.

• Early contractor involvement in the design of the Velodrome achieved 10 times less materials than previously, precast concrete being manufactured to standard plywood sheets, reduced cable net roof weight and less foundations. At peak the client had 17 staff helping the contractor to meet sustainability targets.

• Because of the on-going legacy use, the client novated the design team to the contractor. This may not always be appropriate.

• The best component of the superb safety record (first time a Games stadium has been built with no fatalities) was driven by the client.

• Internal league tables amongst the contractors encouraged best-in-class and innovation. For example 58,000 new lighting units were brought to the market early, dramatically reducing energy consumption.

• Training and educating the workforce extended to basic teaching of education, enabling some to achieve NVQ qualifications. The Learning Room was made available outside work hours. Site managers were mandated to receive certain levels of training and to encourage new legacy outcomes in education and diversity.

• Although targets on employment (training, diversity, women in construction, local employment and employment of long-term unemployed) were not written into all contracts, the common focus through the community of contractors ensured that these targets were exceeded.

• Successful approaches in programme management include constant monitoring of trends in risk, regular and simple reporting, a formal Change Board to agree contract variations, open communication and early decisions. Risks did change over time, but mitigation of risks began three months ahead of likely impact.

• To achieve integrated commissioning a Reference Design Authority was created which approved requirements, design, delivery, testing and commissioning. They then stressed tested the loadings and planned for recovery planning. A key message would be to establish a head of systems early, and develop a model venue for reference.

• The use of the delivery partner facilitated quick and convenient ‘sign up/sign off’ of staff resources to the programme. Great store was placed on clear baseline scope and strict control processes. Clear delegation was given for the delivery partner to make certain decisions.

• Key messages are to always keep some float in the programme, and allow the delivery partner to remain wholly focused on delivery whilst the client deals with stakeholders and politicians.

• Post-research identified the following success factors: being credible with evident conviction; consistent; confident; breeding leaders; empowering; and an organisation management with courage and competence.

These are the views of Malcolm Noyce, Executive Director, MPA
By the end of 2011 the London Olympic Park, the Olympic Village and non-London facilities will have been handed over to the London Organising Committee of the Olympic and Paralympic Games (LOCOG) for venue operations and Games-time readiness.

This event was the fifth in a series of MPA seminars monitoring the development of the London 2012 Games. It looked backwards at a timely delivery and determined if this is an opportunity ‘to celebrate UK construction’.

With presentations from a wide range of speakers, the seminar started by discussing the part contractors have played in the more intangible aspects of the programme such as legacy and sustainability. It went on to examine the role of schedule management in the successful coordination of construction and integration on a multi-contractor site, and the technical challenges of integrating multiple systems in the testing, commissioning and subsequent handover processes to LOCOG.

The seminar was chaired by Gordon Masterton, Chairman of the Construction Industry Council and Vice President at Jacobs Engineering.

The seminar was opened by the Director General of the Government Olympic Executive (GOE). He provided a brief overview of the strong platform of achievement to date, for example in terms of construction, ticket demand and the testing regime, before looking at the legacy aspects of the Games.

In 2003 the International Olympic Committee revised its charter to include an explicit aim to ‘promote a positive legacy to the host city and the host country’. London’s bid to host the 2012 Games included certain legacy promises, especially for young people. In June 2008 the GOE created a legacy action plan, and in 2010, following a change of government, this was republished with four consolidated themes:

- **Sports legacy:** harnessing the UK’s passion for sport to increase grassroots participation – e.g. through community and school sport.
- **Economic legacy:** exploiting the opportunities for economic growth – e.g. protecting and creating jobs.
- **Social legacy:** promoting community engagement – e.g. using Olympic and Paralympic values to inspire and educate.
- **Regeneration legacy:** the Olympic Park to be developed as a principal driver of regeneration in East London – e.g. transformation of the transport system such as major improvements to Stratford station and the extension to the Docklands Light Railway.
The presentation looked at each of these themes in turn, highlighting key features of what has been achieved to date.

It went on to look at the complexities of measuring and evaluating the legacy benefits, and outlined studies that are in place to address questions such as the impact of the Games on both the UK economy and the uptake of sport. This will enable the Government to understand and demonstrate the long-term impact of the Games.

**CONSTRUCTION’S ACHIEVEMENTS – RAISING THE BAR ON SUSTAINABLE CONSTRUCTION**

In this session the Olympic Delivery Authority’s (ODA’s) Head of Design outlined the journey from winning the bid to host the London 2010 Games to the end of the successful Olympic Park build programme. It was explained how from day one the ODA set out a clear commitment and policy framework to deliver two of the key bid book commitments – the ‘greenest Games’ and a lasting legacy.

Six priority themes were established: health, safety and security; design quality; equality, inclusion and accessibility; employment and skills; environmental sustainability; and legacy. Working with the delivery partner CLM, the ODA established a process by which they could be confident that these themes were being delivered at every stage of the project, but which were not negatively impacting on the progress of the programme and the budget.

The presentation went on to examine how the ODA, its delivery partner and contractors embedded sustainability into the design, procurement and delivery of the programme. In consultation with contractors and stakeholders the ODA set out clear commitments and targets that were felt to be both practicable and realisable.

The targets were then worked back into the design specification and detailed briefs for the venues and Olympic Park. The process was monitored with a code of construction practice and an environment and sustainability management system, backed up by auditing, reporting and a lessons learned knowledge transfer.

Targets for various areas of the programme were discussed, looking at the challenges and successes, for example recycling and waste management through to water usage, sustainable transport, energy provision and the development of employment skills.
CONSTRUCTING A SUSTAINABLE STRUCTURE

ISG has been responsible for the 6,000-seat Velodrome, which will host the Olympic and Paralympic indoor track cycling events and will be used by elite athletes and the local community after the Games. Started in 2009, the Velodrome was completed ahead of schedule and on budget in January 2011.

This presentation looked at the delivery of the main construction phases of the programme, and considered factors which contributed to its overall success.

At the outset, early involvement in the project coupled with a close working relationship with the architects and engineering designers allowed considerable input into the scheme. This provided the opportunity to undertake some engineering exercises to add value – for example, leaving the sheet piles in place in the basement, which not only produced a cost saving, but saved disrupting contaminated land.

Prefabrication of certain elements of the build was an important element in reducing waste, cost and programme time, improving health and safety, and ensuring certainty of quality. For instance, instead of cutting timber for walls and roof on site, it was produced off site in cassette form – this meant working with a number of standard size pieces, saving 31 tonnes of wood going to waste.

The building significantly exceeded the sustainability targets set by the ODA, achieved outstanding results on all environment and sustainability indicators, and is the greenest and most energy-efficient structure on the Olympic Park.

RESPONSIBLE PROCUREMENT – ATHLETES VILLAGE

The Athletes Village project comprises a total area of 27 hectares with 400,000m² of developed space, including 63 residential buildings and community infrastructure. It is a two-stage development: during the Games the Village will provide accommodation for 17,000 athletes and officials, and 2,818 homes will be retrofitted post-Games.

Lend Lease has worked closely with the ODA to deliver development, design and construction services for the project. By the time the legacy facility is finished in 2014, Lend Lease will have been involved with the Athletes Village for seven years – from inception, development of design and planning, through to facilities management and final handover.

In this presentation the challenges set by the ODA’s core themes and the successes achieved through responsible procurement were discussed in four focus areas: responsible design procurement, workforce engagement, risk management, and measured sustainable outcomes.

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The key drivers for sustainable procurement were responsible sourcing, working with the industry to develop new products and employing industry best practice – for example, making concrete using up to 70% granular ground blast furnace slag has reduced embodied energy by 50%, saving 40,000 tonnes of carbon dioxide.

The successes were summarised, reflecting on the impact to Lend Lease and the broader industry – for example it was noted that the ODA’s priority themes provided a very clear template for procurement success and encapsulated absolute clarity of key performance indicators.

Balfour Beatty has carried out a series of projects for the London 2012 programme, including the Aquatics Centre on the Olympic Park.

In the delivery of the infrastructure and venues the Government’s vision surrounding sustainability and legacy was addressed by the setting of tough yet achievable targets.

Employment was central to these targets since, from a regional perspective, aspirations and opportunities have been high amongst the local population and local businesses. Meeting those expectations and addressing the vision needed a comprehensive plan, and an enlightened client who would set the ground rules and support tough, but achievable objectives for contractors.

The ODA set out what was expected of the Tier 1 and Tier 2 contractors, but also created their own teams to support and monitor the employers. This ensured that Tier 1 contractors were supported in their journey towards meeting the employment targets.

The presentation summarised the Balfour Beatty response to the ODA approach, starting with an outline of the range of initiatives and methods adopted as a strategy for employment. For example, expectations were embedded in the procurement process, and there was a very full programme of engagement with local schools. It looked in particular at some of the achievements in relation to the Aquatics Centre project, where it was noted that over 10% of the employees lived in the five host boroughs and more than 25 apprenticeships were created.

The session concluded by considering the overall achievements, the difficulties and the legacy – for the employees, the ODA and for Balfour Beatty.
Team Stadium is the design and build group responsible for the construction of the London 2012 Olympic Stadium on behalf of the ODA: an 80,000-seat capacity stadium, capable of conversion to a 25,000-seat arena after the Games.

This presentation from Sir Robert McAlpine, the principal contractor, outlined the brief: this was not only to construct a stadium to a design not built before, but also to provide a legacy of trained and motivated people and develop a diversity training plan for all levels of staff employed on the programme.

The team’s primary focus was on health and safety and the environment, but its wider role was to shape the training and development programme for individuals on the project. Objectives were set which would go on to establish new standards in site safety, health and environmental performance and create a culture of ‘respect,’ all of which would be underpinned by training.

The session went on to explain how the project’s innovative training programmes and the workforce engagement combined to achieve these goals and reach completion under budget and ahead of schedule. For example, it looked at how Team Stadium approached and supported apprenticeships and how they assisted the supply chain in qualifying their workforce. Other successful initiatives involved an on-site learning facility, and work with the Women into Construction Scheme, the Construction Youth Trust, the Prince’s Trust and Construction Ambassadors.

CLM, the ODA’s delivery partner, looked at the key risks to the Olympic build programme at different stages of construction, and the processes applied to manage the risk profile to a successful outcome.

The session started with an overview of the three main components of risk management: identification of risk and the development of a risk register; assessment of the likelihood and impact of risks; and mitigation plans and actions. It focused on the practical application of standard risk management processes, and how these were tailored to meet the specific needs of this high-profile and very visible programme.

It went on to consider the allocation and management of contingency, and the reporting methods used to integrate the total programme and projects risk profile on an ongoing basis. Methods such as dashboard reporting provided clarity and transparency to project teams and stakeholders, and enabled effective decision making by the management team.

The presentation concluded by looking at the key performance differentiators which contributed to the success of the overall process. One important factor was the decision taken at the beginning of the programme to mandate the use of the Quantitative Risk Assessment (QRA) to evaluate risk. QRA is calculated quarterly for funder, programme and project contingency and the reserve is adjusted accordingly. Usage of contingency is with the approval of regular governance meetings.
The ODA appointed separate design and build contracts for each of the Olympic Park venues and major infrastructure works. This meant that no prime contractor was accountable for the functioning of the Park as a whole, which posed a significant challenge to systems integration. In addition, operational requirements were not well defined early in the programme so a high level of flexibility was required in the project briefs.

The systems comprised IT; telecommunications; security and safety elements such as CCTV and lighting; building and facilities management; command and control; and mechanical and electrical. This presentation outlined the ODA’s journey to integrate and test these systems, the successes and some of the lessons learned.

For example, a systems integration team was established for the development and implementation of a programme-wide strategy for the delivery of systems that were fit for purpose, compatible with LOCOG’s overlay and minimising redundancy in legacy. A site-wide infrastructure brief was developed, and a Systems Designer’s Guide produced which provided detailed instructions about what the venue and the infrastructure design teams had to deliver.

Early understanding of probable Games and legacy modes of operation were key. The strategy was to provide technology spaces that were ‘fitted for, but not with’ the infrastructure and equipment needed for Games overlay and other legacy systems.

Progressive assurance was carried out on all systems, through scope verification; design and delivery assurance; test and commissioning; utility risk assessments; systems proving; and systems recovery planning.

It was noted that one of the successes lies in the body of knowledge and capability within the systems integration team: the ODA is able to provide support and guidance to LOCOG, the Olympic Park Legacy Company and other organisations requiring complex systems integration.

The ODA’s programme has succeeded in delivering high-quality venues and infrastructure on time and under budget, whilst also achieving exemplar results related to the ODA’s priority themes.

In this presentation the CEO of the ODA looked at some of the key elements that have contributed to project success: for example clear alignment of objectives, application of rigorous programme management and strong leadership at all tiers, combined with the human factors aspect – the positive attitude, behaviour and interaction between the people involved.
There is no ‘silver bullet’ or single factor that can bring success to a project of this kind: it is the result of a combination of factors involving the organisational, structural and operational mechanisms. For example, it was crucial to have quality contractors with proven delivery capability, overlaid by the strong project management capability of a delivery partner and the intelligent client role of the ODA working together to achieve the same goals.

ODA priority themes were incorporated into the overall programme as much as possible. Metrics were put in place for health and safety, and people were reminded continuously about sustainability, equality and inclusion, design and accessibility and employment and skills.

The importance of leadership was stressed throughout the presentation. Leadership goes beyond process: it is about going beyond the normal brief to resolve difficult issues and to establish the right relationships and creating a culture that inspires others to achieve more than they think they can.

The final session of the day looked at research being carried out by the Loughborough University Research team as part of the Olympic legacy programme.

This learning legacy research has included external scrutiny of the different systems and practices associated with the main 2012 build. In addition it has explored why or how things have worked, and for this, focus has centred on some of the human and organisational factors. The presentation examined the research in relation to leadership, looking at the research process and the findings.

To build an understanding, interviews were held with people throughout the construction supply chain, and with third parties such as regulators. In addition researchers sat in on some of the close-out and lessons learned sessions. Researchers were interested not just in people’s observations of themselves and their peers, but also which of the influences on them had carried most weight.

In terms of leadership, comparing (and contrasting) the views has demonstrated, for example, the importance of clear and consistent convictions, open and frank relationships, respect through all levels, positive peer pressure and a just culture dealing with failure and rewarding success.

The presentation went on to consider in detail the leadership approach which underpinned the leadership characteristics, and factors that were observed to have contributed to the success of the main 2012 build.

It concluded by looking at the legacy that can be passed on to future projects. It was noted that an intended legacy will be where aspects of the learning are translated into other projects; beyond this will be the legacy from individuals involved at all levels, as they move out into the industry.
In summing up the day's proceedings, the Chairman noted that the successful delivery of the infrastructure for the London 2012 Games has ‘raised the bar’ in many ways – for example in project leadership, occupational safety, risk management, sustainable design and construction through to community engagement, local employment, energy efficiency and the recycling and reuse of building materials.

It is important that improvements are continued for future construction projects and that the knowledge gained from the Learning Legacy initiative is retained.
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