



Delivering Transport for the London 2012 Games

October 2012

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Foreword

The scope of transport operations for the London 2012 Games was the most demanding the nation's transport network has ever had to meet and the response of the UK transport industry was outstanding. Together it successfully delivered the best public transport Games ever.

In total some £6.5bn was invested in transport schemes that supported the Games. Much of this work was already planned by the main transport operators. In addition the Olympic Delivery Authority (ODA) invested an extra £500m in schemes to support transport to the venues across the UK and leave a legacy and around another £500m on operations at Games time.

As an industry we have learned a great deal about how to plan, build and operate a transport network able to meet the unprecedented logistical challenge the Games presented. With the Games behind us, there are many tangible legacy benefits – from the infrastructure itself to the enhanced service operations, collaborative working, volunteering, freight and logistics, new ways of working and communication to customers.

Our challenge now is to continue to work together to capture and build on what we have learned and achieved.

This legacy report 'Delivering transport for the London 2012 Games' has been produced by the ODA with the help and support of the main transport Delivery Partners – Transport for

London (TfL), Network Rail (NR), The Association of Train Operating Companies (ATOC) and the Train Operating Companies (TOCs), the Highways Agency (HA), the Department for Transport (DfT), the Greater London Authority (GLA), London Organising Committee of the Olympic and Paralympic Games (LOCOG), London Boroughs and London Councils.

The transport programmes already planned by the transport industry before London won the 2012 Games, have been well documented. This report aims to provide the overall picture of how transport for the Games was achieved, what was learned on the way and the transport legacy provided. It focuses particularly on detailing the additional projects and programmes – mainly funded by the ODA - that would not have happened without the London 2012 Games being staged.

In addition, links are provided to further reading providing greater detail on particular aspects of the work and to key documents produced by the transport partners.

Transport for the London 2012 Games was an exciting and unique adaptation of our existing networks. Enshrined in its successful delivery is the opportunity to change the UK transport map forever. We now need to ensure that lessons are learnt and, more importantly, shared across industry, new bid cities, wider mega event arenas and Government to build on what was a fantastic summer for transport across Great Britain.




Hugh Sumner
Director of Transport
Olympic Delivery Authority




Peter Hendy CBE
Commissioner
Transport for London

The London 2012 Transport Challenge





Olympic Games

34 competition venues

26 sports

10,500 athletes

8.8 million tickets

Paralympic Games

20 competition venues

20 sports

4,000+ athletes

160 countries

2.7 million tickets

The scope of transport operations for the London 2012 Olympic Games was the most demanding the nation's transport network has ever had to meet - 34 venues, 26 sports, 10,500 athletes, 8.8 million spectators and 22,000 media; more than a million additional journeys on the busiest day.

In addition to the 24 London venues, a third of the spectators and ten of the venues were outside London: five football stadia across the UK, plus five venues in the south east including Sailing at Weymouth & Portland in Dorset, Rowing at Eton Dorney and Mountain Biking at Hadleigh Farm in Essex.

For the Paralympic Games just two weeks later, there were 17 competition venues, 15 in the Olympic Park and 'River Zone' in London and two in the wider south east. Around 4,000 athletes from over 150 countries competed in 20 sports and over 2.7 million spectator tickets were sold.

Millions of people lined the routes during the two national Torch Relays and during the road race events.



And the sheer numbers were only part of the challenge. In addition:

- The commitment was made early on to deliver the first ever wholly public transport Games, a significant challenge in its own right
- The Games were held in one of the largest and busiest cities in the world, which had to be kept moving in a day to day sense throughout
- While providing the best possible facilities for the athletes was, rightly, the central imperative it meant that the venues chosen were not all, at that time, the most accessible by public transport
- The approach was constrained by what could be delivered within a major city and to the very tight timescale of the immovable 2012 deadline
- More than 40 organisations were responsible for different aspects of Games transport, so working together as an integrated transport industry was essential. This level of co-operation - joining up national rail, the London Underground network, buses, London Rail and numerous other specialist transport groups - had never been attempted before
- Everyone involved was also determined to leave a lasting, positive legacy; achieve maximum value for money; put sustainability, accessibility, safety and security at the heart of the strategy; and ensure that 'sport - not transport' dominated the headlines

The Result

The response of the UK transport industry and local authorities to this unprecedented transport challenge was one of the great achievements of the phenomenally successful London 2012 Games.

Years of planning, challenging programme management, strong operational performance and joint working ensured that transport services operated well, keeping London and the UK moving and open for business while carrying a record-breaking number of passengers.

London already had experience of planning and delivering numerous large special events every year, such as the London Marathon, Notting Hill Carnival and New Year's Eve celebrations. So there were existing operational, safety and planning approaches that could be adapted and expanded. But even so, the London 2012 Games were an unprecedented challenge.

Not only has London proved that it can plan, build and operate a transport network able to support the most challenging logistical exercise, but there are also many legacy benefits from the Games - for instance in infrastructure and operations, partnership working, volunteering, freight and logistics, and communication to customers and businesses. In the long term, improvements to the service will give people who live close to it better transport links across the capital and access to the new jobs and facilities that will be created in east London.



In addition, substantial savings on the London 2012 transport budget have been returned to Government.

This Document

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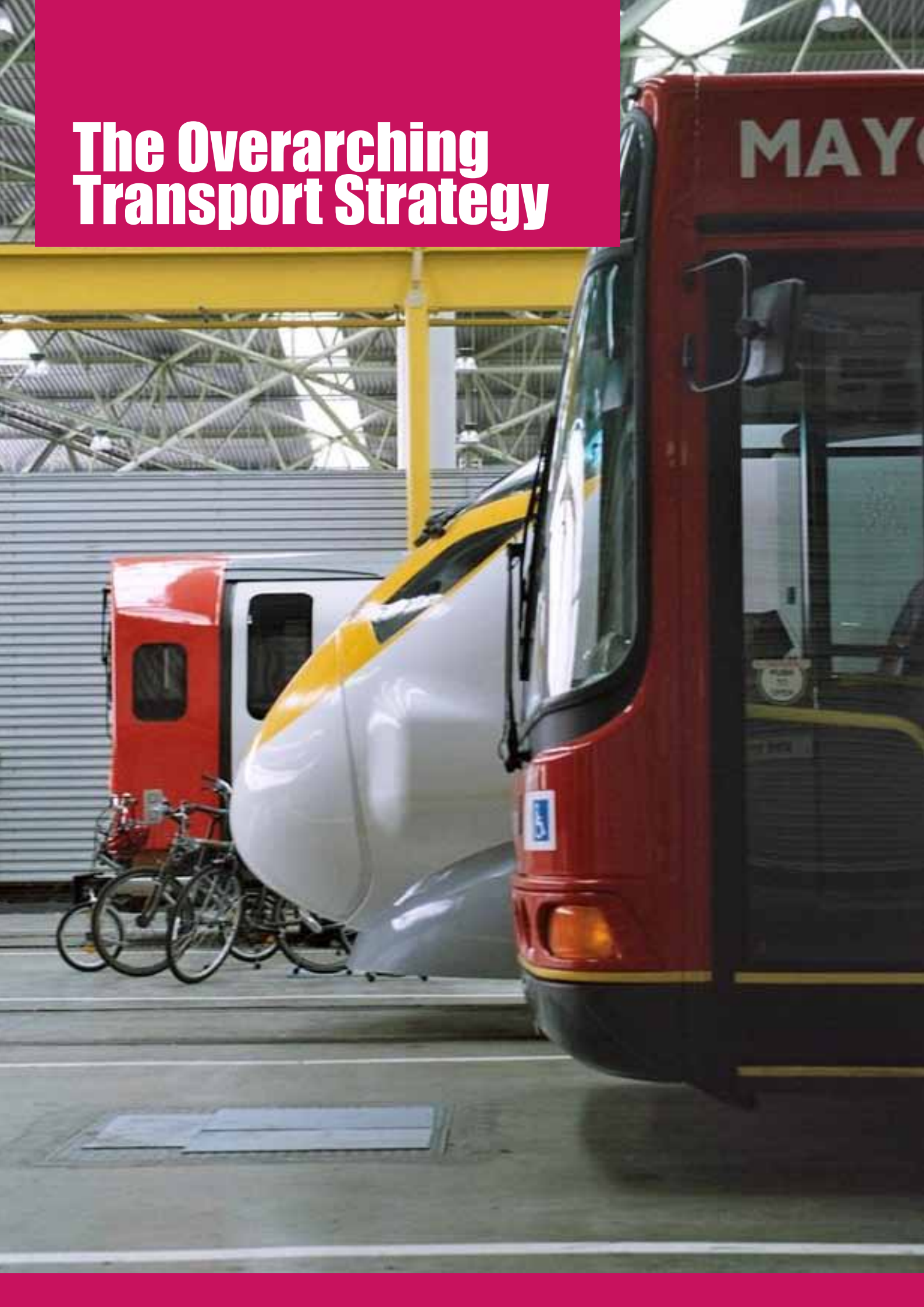
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“The Games were held in one of the world’s largest and busiest cities, which had to be kept moving”

Over a million extra journeys for the busiest days of the Games

The Overarching Transport Strategy



The importance of transport to the success of the London 2012 Games was recognised at an early stage during London's bid and the resulting transport strategy and plan evolved over the following years in response to the requirements of the International Olympic Committee (IOC), International Paralympic Committee (IPC), International Sports Federations, LOCOG, the key objectives developed by the ODA together with TfL local authorities and other operators and with the imperative to keep London and the UK moving.

The strategy was designed to balance the realities of the constraints imposed by the timescale and venue locations with the determination to deliver on a number of key objectives:

- Ensuring that athletes were the top priority
- Aiming to achieve almost 100% of ticketed spectators travelling to competition venues by public transport, walking or cycling
- Keeping London and the UK moving during the Games
- Ensuring that the Games were accessible from all parts of the UK
- Leaving a lasting, positive legacy
- Achieving maximum value for money

The competition venues were selected by taking a range of criteria into account. These included the requirements and guidelines from each of the International Sport Federations and the International Olympic Committee, as well as London 2012's philosophy of making the best use of existing facilities and public transport and taking into account legacy needs.

Roles and Responsibilities

A number of organisations had key roles and responsibilities:

- **ODA.** In addition to the Transport Plan, the ODA's Transport team was responsible for coordinating spectator transport, planning of the Olympic and Paralympic Route Network (PRN) and its delivery outside of London, and delivering transport infrastructure for the Games. In addition, ODA initiated the travel demand management and freight programmes, which were transferred to TfL for implementation and operation during the Games

- **LOCOG.** LOCOG was responsible for planning and delivering transport services to the Games Family, which included athletes, technical officials, press and broadcast, marketing partners, members of the IOC and various International Sports Federations

- **Delivery Partners.** TfL, London Boroughs, NR, the TOCs, ATOC, HA, and the GLA
- The partners were ultimately responsible for the transport of spectators and workforce. The success of transport during the Games was underpinned by the delivery of the infrastructure schemes within budget and well before the start of the Games and a collaborative planning and operational regime

- TfL was responsible for the delivery and operations of the Olympic Route Network (ORN) and Paralympic Route Network (PRN) in London and for managing demand on the transport network via an integrated communications strategy agreed with all transport operators
- London Boroughs helped represent local communities and were able to use established relationships to improve communicate with residents business and other key stakeholder
- TfL and London Boroughs worked with utilities to reduce works on the highway through Clearway 2012 over a two year period prior to the Games. The strong relationships reduced traffic disruption
- **DfT.** DfT took the Government lead within the Olympics transport domain, representing the public interest in transport
- **Cross-industry groups** such as the Games Transport Board chaired by the Commissioner of TfL, the Borough Transport Forum, the Freight Forum and Venue Transport Working Groups played a key role throughout

The effectiveness and integrity of relationships between transport partners was tried and tested through an extensive testing and readiness programme including desktop exercises and live tests.

At Games time, a round-the-clock problem solving regime was put in place, with collective leadership of transport the shared responsibility of the managing directors and chief operating officers of the various transport bodies who made up the Senior Transport Officers Group (STOG).

Key Elements of the Strategy

The Games transport operating strategy was predicated on providing enough operational, people and financial resilience to keep moving forward, whatever happened - business as planned but not necessarily business as usual. Potential problems were extensively and thoroughly planned for. To respond to the complication of the continually changing pattern of events and therefore congestion on different days, transport systems were designed to provide redundancy and resilience by providing multiple modes, many routes and spare resources, for instance people, money, trains and buses.

The best possible use was made of existing transport infrastructure and services. New infrastructure was built only where it was essential and would leave an appropriate legacy.

Bespoke road transport services were provided for the Games Family – the athletes, team officials, press, broadcast and other officials – to ensure they had safe, reliable and secure transport services between their accommodation and their destinations.

For spectators the strategy was based around transporting all ticketed spectators to all competition venues by public transport, walking or cycling. No private car parking facilities were provided at any venue, except for some pre-booked accessible parking and Brands Hatch Paralympics venue. Strict parking controls were implemented on a temporary basis around each venue.

Regular users of the transport network were encouraged to plan their travel and consider their travel choices in advance, including changing their routes, time of travel or mode by which they travelled, to avoid the busiest parts of the transport network and where possible, reduce their need to travel altogether.

To achieve best value for money and ensure that transport plans worked equally well for both the Olympic Games and Paralympic Games, an integrated approach to transport planning for both Games was adopted. The strategy aimed to minimise the need for transition works between the end of the Olympic Games and the start of the Paralympic Games, while at the same time acknowledging the differences in the profiles and needs of spectators attending each Games.

For example, the reopening of the schools during the Paralympics increased the pressure on the public transport network, which required to be carefully managed via an intensive communications campaign and with additional provision of coaches and therefore different parking requirements.

A Lasting Physical Legacy

In total some £6.5bn was invested in transport schemes that supported the Games. Much of this work was already planned by the main transport operators. In addition the ODA invested an extra £500m in schemes to support the venues across the UK and leave a legacy.

There were two main ways to meet the aim to deliver a public transport event: create new public transport systems but risk them becoming redundant after the 2012 Games; or invest in and enhance the existing network.

In a purely practical sense, the latter course was the obvious choice because it was deliverable in the six-year timescale and because of the lack of physical space and high capital costs associated with inserting new systems in existing cities.

But by far the major influence in the decision to invest in existing systems was the opportunity to use the significant investment in transport to deliver benefits that will be felt by passengers long after the 2012 Games.

The great majority of these permanent legacy benefits were delivered by the end of 2010, a year before actually needed for Games time capacity and operational needs.



The Olympic Transport Plan



The ODA was required by the 2006 Olympic and Paralympic Games Act to deliver an 'Olympic Transport Plan' (Transport Plan for the London 2012 Olympic and Paralympic Games). The Transport Plan presented an overview of the proposed transport arrangements during the Games for spectators and public transport users. It also consisted of a fully consulted set of strategic guidelines and operational principles for transport systems and operations, covering every mode of transport. Importantly, the Transport Plan was the over-arching plan that set out public commitments for transporting spectators and athletes to the Olympic and Paralympic Games, whilst keeping London and the rest of the UK moving.

A wide range of stakeholders worked with the ODA in development of the Transport Plan including LOCOG, the GLA, the Delivery Partners (TfL, London Boroughs, NR, the TOCs and the HA), the DfT, individual local authorities affected by the Games, other transport organisations and accessibility, environmental and community groups.

The plan developed iteratively, becoming more detailed and comprehensive as the Games drew closer and was supported by individual operational plans for the various modes and venues. The first edition of the Transport Plan was published in 2007, following extensive consultation and a second consultation draft was published in 2009 with the final second edition in June 2011. The central elements of the Transport Plan were:

- Ensure that athletes remained the top priority; primarily achieved through an ORN, co-ordinated road traffic management systems and bespoke fleets of vehicles to move the Games Family efficiently, whilst keeping London and the UK moving during the Games
- An accessible Games from all parts of the UK, especially to and from major transport hubs, to the competition venues and through to event seat
- Working to the ideal of a 'public transport' London 2012 Games i.e. close to 100% spectators using public transport, walking or cycling to travel to competition venues, enabled through the provision of a Games Travelcard and attractively priced fares
- Enhancing the capacity of transport infrastructure, permanently, wherever there was legacy value and temporarily elsewhere, where essential to meet short term capacity demands
- Temporary enhancement to transport systems where required; for instance, park-and-ride and increased rail capacity at certain times of day, running public transport services earlier and later in the day
- A co-ordinated multi-agency and multi-modal approach to transport management, at the centre of which was a Transport Coordination Center (TCC) which facilitated transport information, monitored events and co-ordinated the transport response and a "C3" (Command, Control and Co-ordination) management protocol used without exception across all Games wide organisations such as security and city operations
- An extensive Travel Demand Management (TDM) programme designed to influence the travel behaviour of spectators, regular travellers and businesses



Paralympic Transport Plan

The 2006 Act also required the ODA to produce and monitor a transport plan for the Paralympic Games. The second edition Olympic Transport Plan published in June 2011 also incorporated plans for the Paralympic Games. Special measures were developed to respond to the key differences – for instance plans for schools and special needs groups and the fact that the Paralympics took place largely in East London. In late 2011, the ODA also produced a Paralympic Transport Strategy for use with London 2012 transport partners and this focused on the key differences between the two Games.

However, at the very outset of planning for the London 2012 Games, the decision was made that while there were two Games, there would be one transport plan with the system flexed between the Games. The transport domain worked closely with disability groups of all kinds and transport operators to ensure that, where possible, both Games were planned at the same time, so that requirements for the Paralympic Games could be built into the overall programme, thereby minimising the need for re-work during the inter-Games period.

Planning involved all major transport organisations to ensure that operational integration of services and processes was achieved across all modes and venues. Measures in place for the Olympics but enhanced for the Paralympics included:

- Bespoke ticketing strategy and booking process focused on schools and special needs groups (including park and rail and drop off zones) , but with the greatest focus on the Paralympics
- Enhanced rail services, including the High Speed service from Ebbsfleet were retained, with alterations to meet the needs of the Paralympics
- Augmented shuttle buses from rail station to venues were retained at three locations
- Direct coach network covering the Home Counties was retained on a smaller scale

Working in Partnership

The task of delivering safe, inclusive and reliable transport for the Games impacted on the whole of the UK transport sector. The ODA and LOCOG worked with a wide range of partners to ensure that London 2012 will be remembered as the best connected Games ever. Many stakeholder organisations were involved in the development of the Transport Plan and in addition, these, and many more, were involved during the detailed planning and operational phases.

Transport for the Games was delivered through a partnership between the ODA's Transport team, LOCOG and a number of transport authorities, including:

- TfL
- London Boroughs
- DfT and Traffic Commissioners
- HA
- TOCs and ATOC
- NR
- London & Continental Railways, including Union Railways (North)
- GLA
- British Airports Authority (BAA)
- Other transport and service providers, including London boroughs and local authorities and transport operators across the UK

Key Client Groups

As part of hosting a successful Olympic and Paralympic Games, the Host City Contract required the safe and efficient movement of three key groups of people:

- **The Games Family.** Transport for the Olympic Family and Paralympic Family, particularly the athletes, was given the top priority. Some 50,000 Games Family members required transportation on any one day during the Olympic Games for training, competition or recreational purposes
- **Spectators.** Over a million spectators used public transport to travel to the Olympic Games on the busiest day of competition. Every person with a ticket to a London 2012 sports event was given free public transport within Greater London for that day and other selected venues close to the M25 corridor
- **Games workforce – staff, contractors and volunteers.** The majority of travel by the 100,000 members of the Games workforce was by public transport. Games Family staff were provided with free transport in London

In addition London and the UK had to be kept moving.

Providing Transport for the Games Family

To support seamless Games Family transport, an ORN and PRN were implemented which comprised a network of roads linking all the competition and key non-competition venues. It was used in conjunction with traffic signal management to facilitate the transport of Games Family quickly and securely between accommodation areas, all competition venues in London and the south of England, and other venues, such as the principal international arrival port of entry for the Games Family – London Heathrow Airport. In general, the roads were still available for use by all traffic during the Games. Some traffic lanes were allocated as Games Lanes, reserved for authorised credited vehicles carrying the Games Family on the busiest sections of the ORN and PRN.

Spectators and Workforce Transport

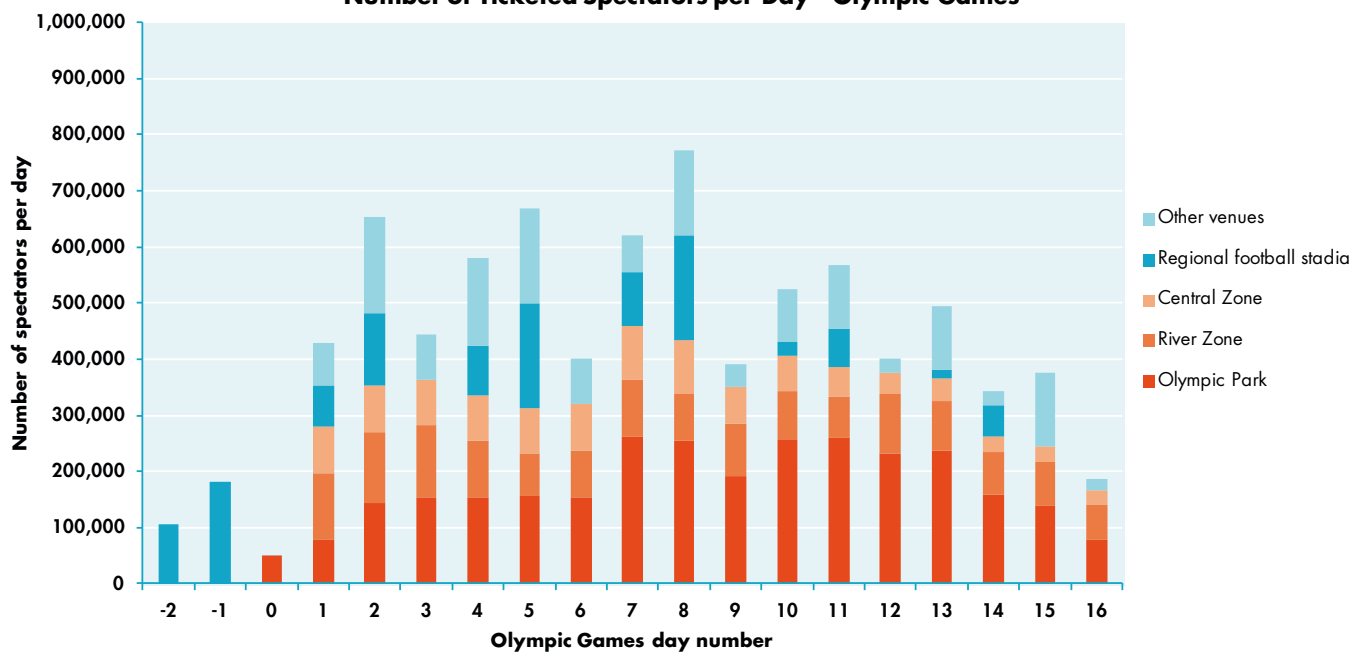
A key objective of the London 2012 Transport Strategy was to provide all spectators from across the UK and overseas visiting the Games with frequent, reliable and accessible transport. In addition, there was also an aspiration to deliver the Games in the most environmentally friendly and value for money manner possible. With these objectives in mind, the transport strategy for spectators attending the London 2012 Games looked to maximise the use of public transport, implementing dedicated resources and temporary schemes (such as mobile ramps on the Underground), walking and cycling whilst minimising the use of private cars. Car parking for spectators was not provided at competition venues except for some Blue Badge parking and at the Brands Hatch Paralympics venue.

Demand Forecasting

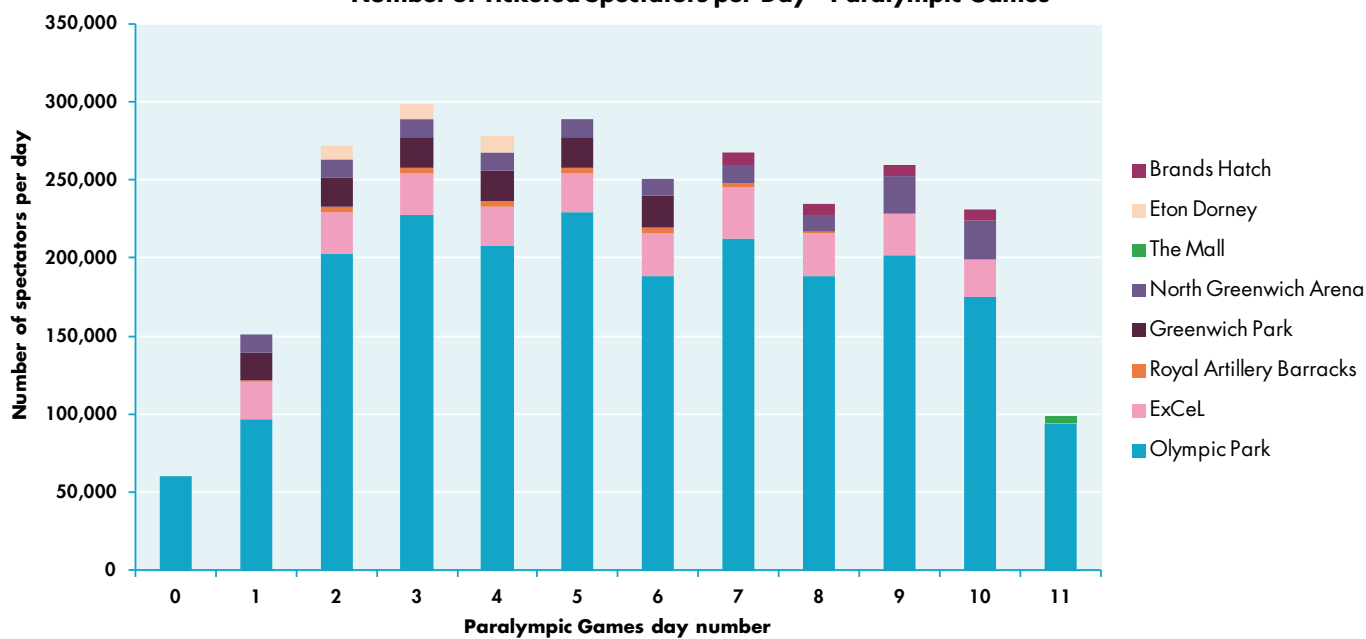
Utilising demand forecasting data, based upon the 8.8 million spectator tickets available over the Olympics and the 2.7 million tickets available over the Paralympics, enabled the ODA to consider the travel generated by each of the competition venues. In addition to this, overlaying the predicted demand data with information relating to the capacity of the public transport network, existing travel patterns and travel choice data prior to the Games effectively informed the Games transport strategies. The strategies were used to inform transport operators' service plans and for the ODA's own accessible and directly managed services. The data supplied also helped in identifying the need for additional temporary or permanent infrastructure. This comprehensive transport planning information supported the development of the TDM targets and ticketing strategy. Given the requirements to keep background demand moving, the careful balancing of the proportion of spectators that travel by different modes and on particular routes was critically important.



Number of Ticketed Spectators per Day - Olympic Games



Number of Ticketed Spectators per Day - Paralympic Games



Ticketing and Journey Planning

Ticketed spectators to sporting events in the London area received a free Games Travelcard for London's public transport system on the day of their event. In addition, spectators were entitled to discounts for river services. Spectators with event tickets to the venues at Hadleigh Farm (Leigh-on-Sea), Lea Valley White Water Centre (Cheshunt) and Eton Dorney (Windsor & Eton Riverside, Slough and Maidenhead) were also able to travel by rail free from central London to the recommended venue using their Games Travelcard.

Spectators were able to plan their journeys on the London 2012 website using a specifically developed SJP.

Rail Strategy

The London 2012 Games was promoted as the 'public transport Games' with the aspiration that 80% of spectators would arrive at Games venues in London by rail, and almost all (99%) by public transport. Within London, London Underground, Docklands Light Railway (DLR) and London Overground had a key role to play in moving spectators to venue stations. The ODA worked with TOCs, ATOC, NR and the DfT to facilitate this aspiration by delivering additional capacity and services to transport spectators to and from the sporting venues. These additional services and capacity were delivered whilst minimising the impact on background demand using existing TfL and TOC services. The Rail Strategy was regarded as highly successful with predicted level of usage not only met but exceeded on some services such as the Javelin®.

Bus Strategy

The use of London Buses during the Games was not intended to be for the mass movement of spectators, as this function was performed largely by rail. However, buses provided a significant local facility, including for those working at and around Games venues. London Buses were included within the Games Travelcard for spectators and, where applicable, Games Family, as all these buses were fully accessible. TfL ran buses throughout the night which were used extensively by the Games workforce with very early or late start and finish times. London Buses also planned appropriate enhancements and diversions/adjustments of bus services made necessary by the ORN/PRN or road events.

Bus and Coach Services

In recognition of the fact that for some, rail may not be the most convenient or practical choice of mode, the ODA provided a network of 2012 Games coach services. The services provided direct links to the Olympic Park, Ebbsfleet, ExCel,



Greenwich Park and Weymouth and Portland venues. Buses also provided a critical support function at some competition venues, providing park-and-ride services locally, and also shuttle services to connect nearby rail stations to the venue entrance.

Taxis

Taxis and private hire vehicles were required during the Games where individuals required a level of flexibility not offered by public transport modes. In particular, taxis provided an accessible travel alternative for those with special needs. They were also useful for members of the Games workforce on duty at venues such as ExCel, where public transport did not run late or early enough.

Park and Ride to the Olympic Park

Even with a comprehensive rail network and additional coach services, it was acknowledged that there may be some spectators who could find it difficult to make their entire journey to and from the Games by public transport. As another alternative, a number of park-and-ride sites were provided for those travelling into the Olympic Park from the North, north-west and north-east London, and the South East of the UK. Sites were carefully chosen, taking into account a wide range of factors, including the expected demand on the local road network, the availability of spaces and the cost effectiveness of the infrastructure and the work required. These sites also provided contingency capability against any protracted problems with mainline rail services.



1,000,000
sq metres of new workspace in
the media centre after the Games.

1,000s
of new homes and jobs
for Londoners.

10
hectares of new open space created.

8
km of waterways renewed breathing
life into the canal area.



Danger

No unauthorised access

Caution

Playing on building sites is very
dangerous. Although adults tell us
not to, some children think it's fun to
play on and around building sites,
but many get hurt or even killed
on them every year.

Please stay away.

Please call the Construction
Hotline if you have any
questions or concerns.

08000 722 110

Pre-booked Accessible Parking for Disabled Spectators

Limited pre-bookable parking spaces were available at all venues for disabled spectators. The quantity and location of these parking areas varied between venues, according to the other accessible transport options available to disabled people. Spectators with a valid Blue Badge, or a recognised national disability parking permit, were able to pre-book parking spaces for the venue of their ticketed competition session at the venue.

Walking and Cycling

Promoting sustainability was at the heart of the transport plan, and walking and cycling played an important role in supporting this objective. A key principle was ensuring that a legacy of local and strategic cycle and walking routes and associated infrastructure remained after the Games:

- 'Hard' and 'soft' measures where hard measures focused on physical infrastructure such as new and upgraded routes, secure temporary cycle parking, and signs and wayfinding systems; whilst soft measures included a programme of awareness-raising initiatives promoted under the Active Travel Programme
- Cooperation and coordination: ensuring a range of stakeholders were continuously engaged in the planning and delivery of walking and cycling activity for London 2012

River Services

Waterborne transport played a relatively small role in enabling spectators to access the relevant competition venues, however as it is an attractive travel option the ODA was keen to maximise its use within the overall available capacity of boats, piers and waterways. Thames Clippers, for example, operated a special express service from Waterloo and London Bridge to Greenwich Park and North Greenwich Arena and Turks a service to Eton Dornay.

Public Realm

The Mayor of London, TfL and London Boroughs implemented a significant number of public realm schemes, which helped improve the look and feel of central London and road network resilience. Examples include the Oxford Circus Diagonal Pedestrian Crossings and making Piccadilly, Pall Mall and St James Street two way working. The ODA helped fund improvements at the junction of Strand, Aldwych and Lancaster Place.

Improved pedestrian wayfinding signage, building on the Legible London Wayfinding system pioneered by GLA, TfL and London Boroughs,

provided effective 'heads-up' style mapping. This was supplemented by additional "Last Mile" signing at event sites.

Information and Wayfinding

The ODA, TfL and London Boroughs also worked together with Delivery Partners and key stakeholders to ensure that there was a coherent information and co-ordinated wayfinding approach (featuring pink magenta branding) from the home to a Games event and home again. A coherent 'look' to Games information was presented for whichever channel of communication was used and on whatever organisation's territory. This look was consistent with the overall Games look and feel and with travel demand management messages. Games-time signage and wayfinding were temporary branded enhancements that were only relevant during the Games.

Road Events

The Olympic Games and Paralympic Games both featured road-based competition and non-competition events. LOCOG worked closely with TfL on the planning and the delivery of all the competition road events held on public roads within London. Outside the capital LOCOG worked with the ODA and the HA. Some non-competition events, notably the Torch Relay, also used roads inside and outside the capital. In order to facilitate the correct operations of these events, it was necessary to close some parts of the public highway and impose restrictions on other parts for the build-up to, and the duration of, road events.

For the Torch Relay, the local authorities and boroughs hosting the road events made arrangements for section road closures and management of the control of traffic in conjunction with the relevant highways authorities.

Freight Transport

Staging the Olympic Games and Paralympic Games presented a challenge of a unique scale and complexity, often described as the country's largest peacetime logistical operation. The initial logistics undertaking for London 2012 focussed on the construction of venues and the associated transport infrastructure, this then shifted to the wide-ranging logistics activity needed to support the period of Games competition, in order to service the venues and to keep London and the rest of the UK working. TfL and London Boroughs was responsible for helping businesses and the road freight industry to plan for and manage the impact of the Games within London, while the ODA's Transport team produced the overarching guidelines for safety of the overall transport programme.

Transport Safety

All London 2012 partners were committed to ensuring that safety risks were properly managed and that all necessary safety controls were in place. This strategic approach to safety risk management was based on the principle that all transport Delivery Partners had mature and approved safety management arrangements in place and used existing techniques to ensure significant hazards and risks were managed. The ODA's Transport team produced the overarching case for safety and assumed a light watching brief over safety assurance for the overall transport programme.

TfL and London Boroughs formed a Central Zone Licensing, operational and safety planning Group (CZLOSPG) which coordinated plans presented by agencies, organisations, LOCOG and others presenting themselves as organisers. This ensured a consistent approach from agencies assessing the likely practical, viable and safe operation of proposals.

Transport Security

The ODA and LOCOG worked in partnership with the Olympic Security Directorate (OSD), British Transport Police, venue police force and the DfT to create an overarching transport security strategy. The transport security project team developed a high level risk assessment approach with the police, transport providers, DfT and security agencies to analyse transport security issues for the Games. A Transport Security Steering Group and Working Group with Olympic Park Transport Integration Centre (OPTIC) representatives from the key transport organisations and other stakeholders, were established to coordinate the approach to transport security.

Readiness for the Games

It was crucial that all transport Delivery Partners were 'ready' to move spectators in a timely and safe manner. Furthermore, assurance was needed that the transport system could cope with peaks on specific dates and at venues nationwide without creating unacceptable risks or delays. A balanced programme of tests and exercises before the Games ensured that this was the case.

Venue-specific Venue Transport Operations Plans were developed and tested for each of the competition venues,

In addition a family of contingency plans was produced to cover all transport modes. These plans were developed using an integrated approach so that cross mode solutions could be properly designed and implemented.

The TCC co-located coordinators from the major transport modes in a single operations room, equipped with all the individual communication and information systems of the parent control rooms. It provided a central point for monitoring and coordinating all transport operations (excluding air and sea) for the entire Games period. It also dovetailed into the overall Games architecture, in particular the Games operations of LOCOG.

During the Games, all the various transport operations were integrated so that the needs of Games Family, spectators and workforce were adequately met without causing undue adverse impact on local residents and businesses.

A transport integration centre to cover the area of the Olympic Park known as the OPTIC was located at Stratford Station, enhancing the communication between the various transport providers and playing a key role in managing the crowd flows between the Park and railheads.

A moratorium was imposed on non-emergency highway works on the ORN between the beginning of March and the end of September 2012. Work was also restricted on sensitive primary and secondary roads in the city during the Games, with a moratorium on non-emergency work by utilities and highways authorities between July 1 and September 9, 2012.

Continuous Learning

Continuous learning was central to the success of transport during the London 2012 Games and the detail of the transport plan was developed and improved right up to and including the Games themselves.

This process began with observation and knowledge transfer at Beijing and Vancouver, supplemented by available information about Games in other cities such as Sydney and Athens. The Manchester 2002 Commonwealth Games was also a useful source of information and additionally a wide range of special surveys at UK sporting events, including Wimbledon, looked in detail at transport behaviour.

All the transport Delivery Partners and many key stakeholders also took part in an end to end scheme of tests, exercises, modelling and training. By targeting the points of greatest risk, particularly around volume, integrations and decision making, the programme provided confidence that transport would deliver. The four-stages of the programme supported the increasing levels of maturity and development, of the transport domain, confirming incrementally that the plan was:

- Conceptually ready
- Functionally ready
- Domain ready
- Games-ready

The programme involved a wide range of different tests and exercises including contingency planning; modelling and observations; desktop exercises; single focus exercises designed to verify or validate a particular approach (people, processes, technology and infrastructure); and test events.

Towards the end of the programme large-scale readiness events involving all the domains (Transport, Security, Government, Games and London) ensured confidence that interfaces, relationships and information flows were ready and prepared.

Other major events in London such as the Queens Diamond Jubilee also helped to inform the approach for the Games and gave confidence in the strategies developed. The real-life experience of having to deal with these major crowd numbers was excellent experience. The event also provided useful TDM customer information and saw a 40% drop in road traffic. This gave added confidence for the Games themselves.

The Torch Relay, which began on May 19th 2012 and took the flame around the UK for 70 days, also proved to be a very helpful rehearsal for the Games themselves and showed conclusively

the need for an integrated approach. The large and enthusiastic crowds wherever the torch went, were unexpected. Having the TCC in place allowed nationwide visibility of issues across transport boundaries. Without this overview of the complete picture, management of the situation would have been very difficult. As it was the TCC's four torch Liaison Officers who followed the Torch on its route around the UK and reported back to the TCC became a useful source of best practise and lessons learned as they travelled around.

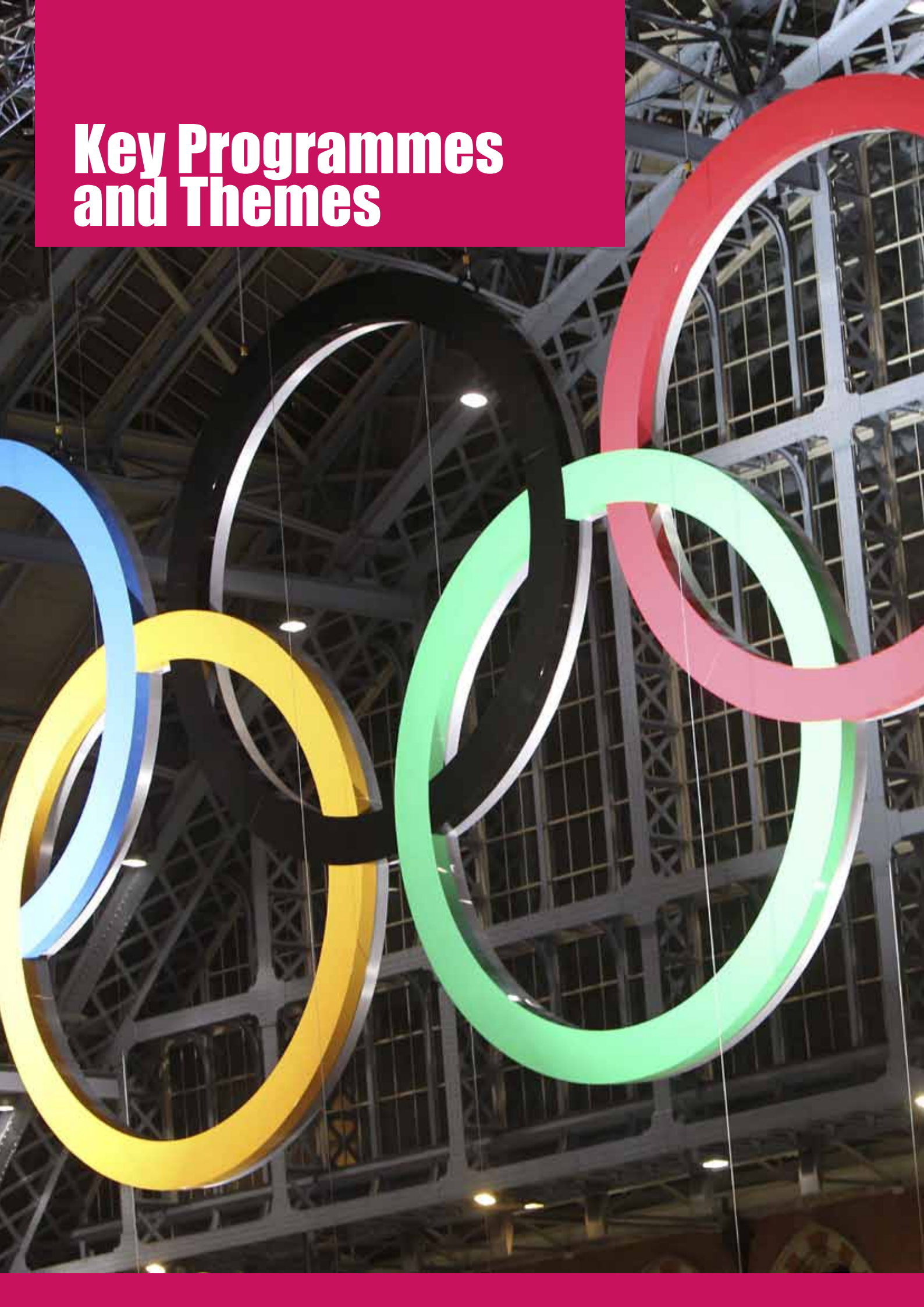
The Strategy in Action

Planning the transport for the London 2012 Games was a long and extensive process that started back in 2003. The planning undertaken especially over the last couple of years was robust and needed only small enhancements in early 2012 for the Paralympics and some adjustments made during the transition period between the Olympics and Paralympics, because of the unprecedented sale of 2.7 million tickets for the London 2012 Paralympics, an increase of almost 50% on the Beijing Games in 2008.

The transport community worked together as an integrated transport network to become recognised as one of the great successes of London 2012. The TCC for the first time brought all the agencies together in one co-ordinated communication facility that was a symbol of the depth of co-operation, integration and preparedness of the transport community.



Key Programmes and Themes



Governance

The task of providing transport for the Games impacted on the entire transport sector across the UK and in London, with 40 organisations sharing responsibility. There were also numerous other organisations, official bodies and cross-industry groups of all kinds whose agreement and proactive support were essential to success.

What is more, transport was only one part of the Games. Integration with the other domains – Security, City Operations, Games Operations and Government was also crucial.

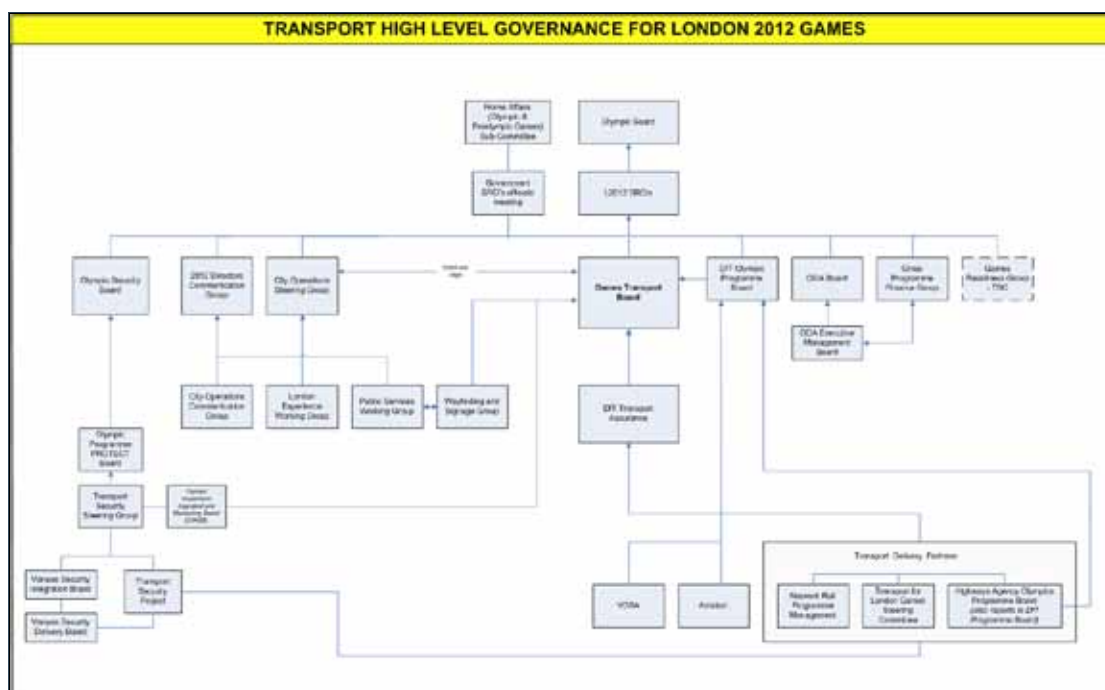
The organisations directly responsible for delivering transport for the Games were:

- The ODA, which in addition to the Transport Plan, was responsible for coordinating spectator transport, planning of the ORN and PRN and its delivery outside of London, and delivering transport infrastructure for the Games. In addition, ODA initiated the travel demand management and freight programmes, which were transferred to TfL for implementation and operation during the Games
- LOCOG was responsible for planning and delivering transport services to the 'Games Family' which included athletes, technical officials, press & broadcast, marketing partners, members of the IOC and various sports federations
- The Delivery Partners, responsible for facilitating the transport of spectators and workforce through planning and managing their respective infrastructure and systems. They included:
 - TfL, the integrated body responsible for London's transport system. It manages London Underground, London Rail (DLR, London Overground suburban train services, Trams and the Cable Car) London's Buses, river services, London's taxis and private hire licensing, Cycle Hire and promotes walking initiatives. TfL is also responsible for London's major highways, all of its traffic signals, the Congestion Charge and the Low Emission Zone
 - NR, responsible for most of the UK's infrastructure, together TOCs and ATOC. They have shared responsibility for delivering train services on a national basis
 - The HA which is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State for Transport

- The DfT and the local authorities affected – particularly those in and around the Olympic Park and other venues – which also had key roles

Other key stakeholders, with an important voice in the process included:

- The Olympic Board - the Olympics Minister, the Mayor of London and the Chairs of LOCOG, the British Olympic Association and the ODA - which took an overview of the whole of London 2012, coordinating the various strands of work, resolving and determining issues raised by members and ensuring a sustainable legacy
- UK Government departments and bodies, such as the Government Olympic Executive (GOE) a part of the Department of Culture, Media and Sport (DCMS) which had overall responsibility within government for the successful delivery of the Games
- Olympic organisations such as the IOC and IPC, the British Olympic Association, the British Paralympic Association and the National Olympic Committees / National Paralympic Committees
- The GLA - one of the bid's three central stakeholders and the Mayor of London, together with LOCOG and the British Olympic Association, was jointly responsible for delivering the Games under the terms of the Host City Contract, agreed with the IOC
- Other GLA family organisations such as London Fire and Emergency Planning Authority, Metropolitan Police Authority, London & Partners (formerly Visit London), and the Olympic Park Legacy Company
- The London Boroughs. London Boroughs are responsible for planning enforcement across London and licensing, are highways authorities for 95% of London's roads including parts of the ORN and worked closely with TfL on freight during the Games. Westminster City Council, in particular, also brought considerable experience of large scale special events
- Key local stakeholders such as the London Thames Gateway Development Corporation, the Lee Valley Regional Park Authority and the Freight industry



- Numerous other transport organisations both public and private sector
- Other private sector organisations and businesses across the UK, working with London 2012 through contracts or other commercial arrangements
- Voluntary and non-governmental organisations, ranging from special interest groups to trade unions
- The people and communities who live and work in the areas that would be affected by the Games

The SRO Group, in turn, was an element of the wider governance for the Games and was controlled by the GOE.

To provide a formal platform for cooperation between the Delivery Partners, operators and Government agencies at a high-level, the Olympic and Paralympic Transport Board was set up early in 2009, led by an Independent Chair. It also provided assurance to the Secretary of State for Transport on planning progress, management of top risks and readiness of transport for the Games. The Board fed into the London 2012 SRO Group.

In addition a London Operations Board was established to ensure successful delivery of integrated transport services throughout London, while outside London and nationally, a National Olympic Transport Group was established to oversee and assure effective transport for spectators attending events outside London and travelling into London for the Games. The group also supported Games Family transport on the out-of-London road networks.

In late 2011, these boards were brought together to form the Games Transport Board (GTB), chaired by the TfL Commissioner and with the same wide-ranging stakeholder representation. This body exercised overall direction, planning and co-ordination of preparatory activities in the twelve months leading up to and during the Games. Risks were highlighted using the Games Transport Progress Report along with appropriate mitigations and decisions to be taken.

Collaborative Working at all Levels

Given the complexity of the task and the number of organisations involved, the key challenge was maintaining the coherence of transport whilst allowing all the partners to manage their areas of responsibility.

Collaborative working was essential at all levels from Board to operations, with agreed and integrated operations plans, effective interface management, transparent risk management and the necessary levels of assurance to ensure successful delivery.

A government Senior Responsible Owner (SRO) from the DfT and a transport SRO from TfL held single-point accountability for Games transport and were part of the Senior Responsible Owners Group which oversaw the delivery of all operational preparation for the Games. Its focus was on overseeing and resolving key cross-cutting issues that had not been dealt with elsewhere. It also held the SROs of the individual delivery programmes to account.

The transport domain also worked closely with other large projects, such as Crossrail and Thameslink, Victoria Station and London Tideway Tunnels due to be constructed in the lead-up to and during the Games. Working groups identified issues and risks occurring at the interfaces between the projects and the Games and developed measures to manage and mitigate them, with formal agreements where necessary.

An Integrated Transport Programme

Building on the transport strategy and the Transport Plan, an integrated transport programme was developed in close consultation with all stakeholders and transport Delivery Partners to bring together all the critical milestones and outcomes identified. This ensured that the timeline for the overall delivery of transport was transparent to each delivery partner and everyone was able to track progress of activities and understand the dependencies.

A portfolio of transport projects designed to provide enough transport to cover the expected peaks of demand, to manage background demand, influence travel behaviour, and leave as much transport legacy as possible had already been identified as part of the bid to host the 2012 Games.

After winning the bid this portfolio was refined and improved based on the latest demand and capacity information. Projects were scoped and budgeted in more detail splitting capital and operational spend, contingency and VAT. The projects were scheduled out with detailed activities and milestones mapped onto a master programme and budgets phased over time. Project and programme risks were identified, assessed, and quantified. The projects were also overlaid with cross cutting themes including health and safety, sustainability, accessibility, legacy, value for money, and interface management. This information was recorded in the Programme Baseline Report in November 2007, having been through close consultation and liaison between Delivery Partners and stakeholders, with subsequent revisions as necessary as the programme progressed and re-baselined in December 2010. The key projects were:

- **Stratford Station modernisation:** A capacity enhancement solution to provide for the long term legacy needs of passengers, also additional temporary measures to meet the specific needs of the Games. Works included the Angel Lane extension to platform 10a and 300m of freight loop, turnout and associated infrastructure and the extensions to platforms 11/12 at Stratford (Lea Valley Line) and crossovers and bi-directional signalling to support enhanced services during the Games, a siding connection for the Olympic Village

batching plant (for Lend Lease) and to Orient Way sidings

- **Platform 10a extension and freight loop – Angel Lane:** Platform 10a at Stratford Station extended and 300m of freight loop, turnout and associated infrastructure built
- **Lea Valley Line:** Platforms 11 and 12 at Stratford Station extended and crossovers and bi-directional signalling added to support enhanced services during the Games. A siding connection for the Olympic and Paralympic Village batching plant and to Orient Way sidings was also built
- **Javelin®:** A high-speed, dedicated shuttle service operating between London St Pancras International and Stratford International and Ebbsfleet during the Games
- **Orient Way sidings:** Relocation of railway sidings from a strategic location in the centre of the Olympic Park to a replacement facility constructed outside the Park located at Orient Way
- **TfL upgrades and enhancements:** TfL changes included: Jubilee and Victoria line upgrades; extension of the East London line; extension of the DLR to Stratford International; increased capacity on the DLR via rail cars and infrastructure modification to enable three-car vehicles operations; enhanced capacity to operate longer trains; and more frequent services on the North London line between Willesden Junction, Highbury and Islington and Stratford, both during Games time and in legacy. Other upgrades included: increased capacity at West Ham Station and direct access to the Greenway; King Cross congestion relief works; and Green Park and Southfields step free access works
- **Rail operations:** A variety of operational measures were implemented by the transport Delivery Partners to add capacity and ensure reliability. Both National Rail and TfL services ran earlier and later finish services, with train operators running longer trains. An increased resilience regime was implemented across the network. Station plans at London termini and venue stations were revamped to allow for the increase in expected numbers. Back office volunteer staff undertook frontline customer service duties at stations. The Javelin® service quickly proved itself to be the favourite way to travel to the Games
- **ORN and PRN:** Road routes to enable the Games Family to move safely, quickly, and reliably between competition venues and non-competition venues within guaranteed journey times. The journey times were incorporated in the Host City contract

- TDM: The London 2012 TDM Programme was designed to influence the travel behaviour of spectators, commuters and businesses during the Games to keep the UK's transport network moving
- TCC: A centralised facility created to coordinate all Games-time transport for the nation across the Olympic and Paralympic Games
- Bus lines: Enhancement of existing local bus networks to provide additional services for spectators
- Cycling and walking: Creation and enhancement of walking and cycling routes leading to competition venues, to create/meet demand for these modes of transport during the Games and also in legacy
- River and ferry: Contribution to enhance piers and moorings infrastructure, provision of enhanced operations and management on key piers during the Games (e.g. staff, signage, barriers)
- Park-and-ride and direct coach: Provision of park-and-ride sites and bus services to support spectator transport services to the Olympic Park, ExCel, and other venue specific park-and-ride services. A network of long and medium distance coach services timetabled and scheduled by the ODA to provide a service for individual travellers on a direct basis
- Venue transport operations: The most appropriate transport solutions or enhancements at venues were identified, developed, and implemented, eg. permanent/temporary infrastructure, operational measures
- Staff and travel ambassadors: Close to 5,000 transport Delivery Partners office staff were redeployed in customer facing roles during the Games to support operational staff, and received considerable praise from customers and media for their friendly, knowledgeable and efficient service
- Transport test events: Spectator transport arrangements tested for each venue and mode prior to the Games
- Aviation: Additional temporary controlled airspace in the South East, together with the extension of the existing airport slot co-ordination regime to 40 airports and the creation of a bespoke Olympic air traffic management unit within the National Air Traffic Service en route air traffic control centre, all designed to accommodate additional Olympic aviation demand while maintaining business as usual as far as possible

Until spring 2011, emphasis was on the improvement of infrastructure to meet the demand of the Games - the transport big build. Focus then switched to operational roles and responsibilities adapted accordingly.

Programme Management

Meticulous planning and programme management was central at every stage from completing all infrastructure a full year before the Games, through developing and selling new ticketing products to customised journey planners for spectators.

The effectiveness and integrity of relationships between transport partners was tried and tested through an extensive testing and readiness regime including desktop exercises and live tests.

The ODA acted as a thin client with a 'light on process, heavy on performance approach' underpinned by a comprehensive assurance framework and strong financial control.

Throughout, the strands of programme management operated effectively across the individual projects. The elements of reporting, finance, risk, programme, interfaces, health and safety, legacy, commercial, legal, sustainability were woven through projects and controlled and assured by the programme team. Particular focus was placed on ensuring that interfaces between the Delivery Partners and suppliers and other key stakeholders were nurtured and developed.

The risks involved with being ready for the Games, as well as with transport operations during the Games, needed effective planning and management. At a multi-organisation level, all stakeholders and Delivery Partners worked collaboratively to further develop and shape the operational risk profile ahead of the Games to ensure effective and efficient operations.

The Olympic and Paralympic Transport Board Member organisations (and later GTB) collectively identified, prioritised and owned the top Strategic Operations Risks that were pertinent to successful operations of Games transport.

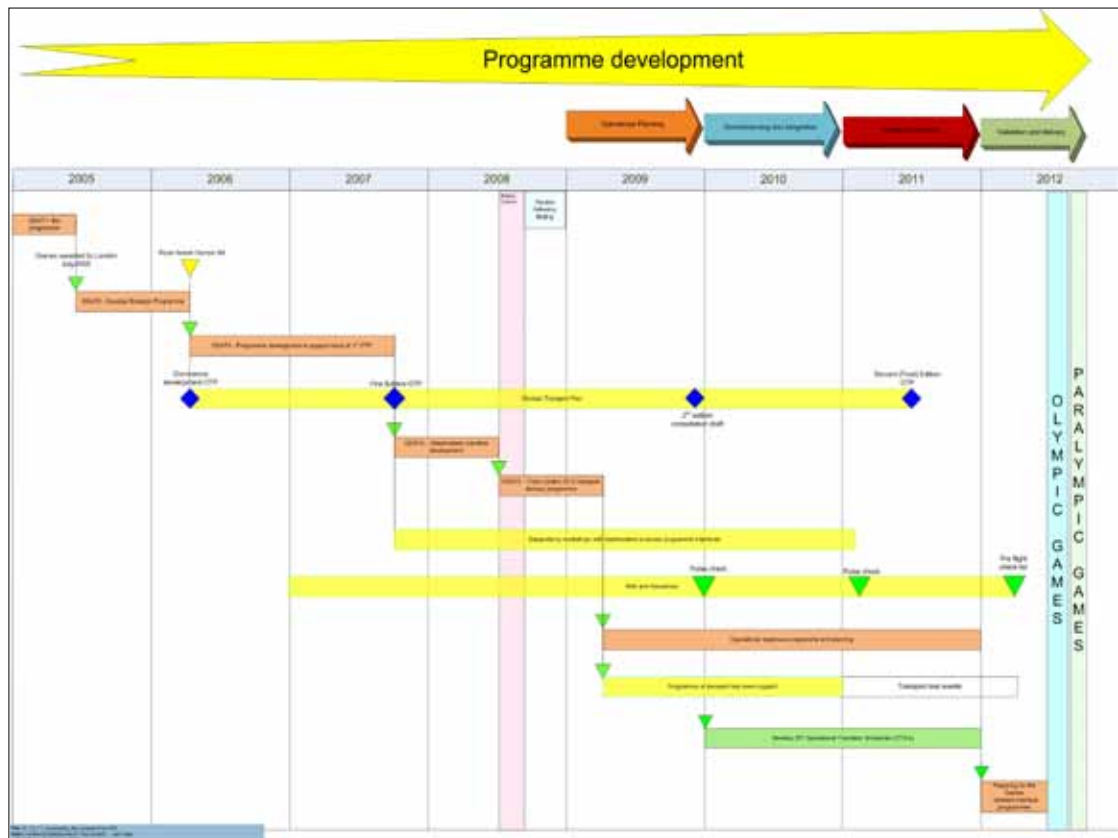
The majority of the projects, in particular the capital projects, were delivered as originally planned, although the portfolio of projects and methods of delivery did evolve as preparations for the Games advanced. All changes were put through a rigorous change control process underpinned by supporting paperwork and approved within a system of delegated authority.

The programme was designed to be flexible and responsive to both external and internal changes. For example, changes to venues, competition schedules, weather conditions, the role of



LONDON 2012 GAMES - KEY TRANSPORT MILESTONES





Delivery Partners, demand and capacity data and information following the sale of tickets.

As the London 2012 project entered a more operational phase, structures changed to ensure a seamless integration between partners - essential to help manage risk. Operational responsibilities were transferred to the organisations with ultimate delivery accountability. This included moving venue transport operations to LOCOG, and ORN and freight in London as well as TDM to TfL. For these projects ODA continued to discharge contract management & assurance with delivery resting with delivery organisations across the public and private sectors.

All Delivery Partners already had established robust and industry accepted review processes for delivery of their own operations. To assure smooth delivery of operations during the Games, a Transport Assurance Board, chaired by the Government SRO was set up with representatives of each relevant organisation to support the GTB.

The ODA ensured the appropriate level of assurance throughout the different stages of the programme. The Assurance Framework for transport had to be dynamic and able to constantly adapt as the project moved through key phases, incorporating:

- Clear critical outcomes and measures of success for each area and phase driven by the transport objectives

- Assurance principles to direct and guide the implementation of assurance throughout the whole Programme
- Qualitative rating method and assurance scale to provide a risk-based and proportionate level of assurance
- Timely 'pulse checks', Games readiness and post-Games reviews to provide progressive confidence to senior managers and stakeholders
- Internal Assurance reports to provide regular progress on achievement of Critical Outcomes
- Assurance Process based upon the Plan, Do, Check, Review/Learn cycle to provide a supportive practical and bespoke method to assist in the implementation of the Assurance Framework

A Success Story – but Hard Won

This approach to governance, ensuring close collaboration between the transport Delivery Partners successfully delivered the end to end London 2012 transport journey, from source to venue, in a seamless and coordinated way.

The effectiveness and integrity of the relationships between transport partners was one of the most critical success factors in delivering transport for the London 2012 Games and it is a shared aim to maintain and reinforce this working relationship in the future.

Nevertheless success was hard won. Building those relationships and endorsing a collegiate approach of this kind had never been attempted before and was neither quick nor easy. It took great determination to overcome the usual organisational boundaries and to collaborate in this way.

Key Lessons Learned

- It is essential to start as early as possible in developing a collegiate approach. A 'transport tribe' involving all key agencies and Delivery Partners needs to be in place some years before the Games to ensure timely delivery and the necessary collaborative and co-operative culture encouraged and nurtured
- The roles and responsibilities of all the key players need to be clearly defined at the outset. For instance, which Government department is leading? It should only be one
- A top level board and supporting groups drawing together all the transport partners needs to be established at the outset, together with supporting focus groups and sub-boards. A clear lead and governance needs to be endorsed by all key players. The transport partners are agreed that it was the Games Transport Board that made the collegiate approach work but that it would have been useful if it had been set up sooner
- The skills of transport Delivery Partners and other stakeholders should be used and shared to best effect
- It is important to consult as widely as possible and keep stakeholders informed to engender good relations and encourage a collaborative approach
- Confidence should be built through accurate, transparent reporting
- Risk should be minimised and capped wherever possible
- Operations need to be planned early: people, resources, systems
- A matrix structure with projects interwoven with cross cutting themes such as safety, security, sustainability and accessibility, led to a much more robust outcome
- Confidence must be built through a clear and comprehensive assurance framework, accurate and transparent reporting, and robust programme management which is light on process but hard on delivery and where the programme itself is king



Physical Infrastructure

From the very start of London's bid for the 2012 Olympic and Paralympic Games there was a determination to host a 'public transport' event.

London's transport network moves millions of people every day but to achieve a public transport Games even greater capacity would be needed. There were two main options: create new public transport systems but risk them becoming redundant after the Games; or invest in and enhance the existing network.

In a purely practical sense, the latter course was the obvious choice because it was deliverable in the six-year timescale and because of the lack of physical space and high capital costs associated with inserting new systems in existing cities.

But by far the major influence in the decision to invest in existing systems was the opportunity to use the significant investment in transport to deliver benefits that were felt by passengers long after the 2012 Games.

Consequently the chosen strategy was to make best use of all existing transport infrastructure and services, building new infrastructure only where it was essential and would leave an appropriate legacy. Wherever possible, cost-effective temporary operational solutions were used to meet temporary peaks in travel demand generated by the Games.

And since London was confirmed as the location for the 2012 Games, billions of pounds have been invested in physical improvements, including new lines, bigger stations and extra services.



A number of these projects were already part of the long term plans of the transport Delivery Partners - TfL, NR and central government - such as the new DLR extension passing through Stratford, and the increased capacity on the Jubilee line, which were completed in time for the Games. Some 40 programmes were co-ordinated and accelerated to assure supply and give an early legacy.

The ODA also funded or part funded a number of additional schemes, which were complete and mostly operational, allowing Londoners to benefit from the investment, more than a year before the Games. They included:

- Stratford Station
- Orient Way
- West Ham Station
- Angel Lane
- Lea Valley Lines
- Coventry Stadium Access Works
- ExCel Pontoon
- North London Line
- DLR Railcars

Stratford Station

During the Games Stratford Regional station needed sufficient circulation capacity for 120,000 passengers during the peak three hours on the busiest day, compared to the 2006/07 capacity of 37,000 passengers. These demand levels required significant works to be undertaken. The station was also not fully accessible and did not meet access standards. This was corrected as part of the scheme.

This included de-cluttering the platforms, creating new lifts and stairwells between the subways and high level platforms, providing extra lifts to the Jubilee concourses, re-opening a subway, extending and widening platforms, creating a new platform for the westbound Central Line, creating a new southern entrance to the station via a Mezzanine extension, and upgrading all systems and signage to suit.

Interfacing schemes went ahead, in parallel, which also increased handling capacity of the station and train services. These included new platforms for the DLR Poplar and International to Canning Town routes; a new northern station entrance for the London Overground services; a new pedestrian footbridge across the railway lines for the new Westfield Shopping Centre; re-signalling of the Jubilee line, plus the Angel Lane freight loop and Platform 10a extension, and the Lea Valley BiDi project which included extension of platforms 11 and 12.

Most of these schemes were either partially or fully funded by the ODA which adopted a coordinating role between the parties. In all, the scheme delivered:

- 4 new platforms for DLR, London Overground and London Underground trains
- 13 new lifts, new stairs and escalators to increase passenger capacity
- Two new station entrances
- New subways beneath the station
- New taxi rank and bus stops
- Power supply and station systems completely upgraded

The project required over 1 million hours of work and was delivered on time and to budget, both with an excellent safety record and minimal disruption to the station and train operations. It also achieved an “excellent” CEEQUAL environmental award

In the long term the station will support the regeneration of the Lower Lea Valley by giving people better access to employment opportunities and amenities and also significantly improve orbital journey options between the north, east and southeast of London.



Orient Way

To clear the way for construction activity the ODA relocated the Thornton's Field railway sidings depot – used to 'park' trains only needed during peak hours – from the heart of the Olympic Park to a new 12-track facility at Orient Way to the north-east of the Park.

Thornton's Field is located in a vital part of the Olympic Park between the Olympic Stadium and the Aquatic Centre. It needed to be available for remediation, temporary logistics access and construction work no later than the end of June 2008 or the Olympic Park programme would be severely compromised.

Two options for the location of a replacement facility were considered: at Lea Interchange, on the northern most edge of the Olympic Park, and at the disused EWS freight sidings at Orient Way, adjacent to the Eurostar maintenance depot at Temple Mills. Orient Way was selected as the most cost-effective option.

The project was substantially completed one month ahead of schedule and at less than one third of the original forecast cost. 99 per cent of demolition material from the original site was recycled or reused, including 2,970m of track and the project achieved an "excellent" CEEQUAL Environmental award.

West Ham Station

Track constraints meant Stratford Regional and Stratford International were not between them able to meet the total demand of the Olympic Park during the Games, so West Ham station provided a third gateway station to the Olympic Park catering for about 18% of spectators travelling by train. It was also the primary contingency station in the event that rail or underground routes at Stratford Regional became unusable for any reason at Games Time.

Around 4,500 spectators per 15 minutes alighted at the District Line platform (spectators on other lines used other stations). The purpose of the West Ham Station project was to enable the station to cope with this demand, as the existing stair and lift from the platform could only carry around 1,100 people per 15 minutes.

New temporary infrastructure was installed that would enable spectators to exit from the platform in either an easterly direction, using a temporary stair and walkway, or in a westerly direction via an existing stair or lift and then through the station. Spectators exited the station and then walked along a public footpath, the Greenway, to the Southern entry point of the Park. Due to the walking distance, travelling via West Ham was not recommended to passengers with mobility impairments. However, step free access that exceeded the lift capacity of the station was provided, with the construction of a lift and a ramp. The temporary infrastructure included:

- Footbridge over the District Line at the eastern end of West Ham station
- Stepped landing providing access to Manor Road
- Staircase and lift from Manor Road to the Greenway
- Legacy step-free ramp to access the Greenway
- Legacy widened access and landscaping between Manor Road and the Greenway
- Energy efficient lighting as required on and around walkways, ramps and steps
- Legacy landscaping including screening for local residents
- Legacy steps from Manor Road to Greenway

Angel Lane

The purpose of the project was to provide additional national rail capacity at Stratford Station, both during Games time, in order to meet forecast spectator journey demand and in legacy, to meet long term forecast passenger demand. The scope of work for the project included:

- Demolition and replacement of the existing Angel Lane road-over-rail bridge
- An extension to Platform 10a at Stratford Station to enable 12-car trains to call at the platform
- A 300 metre freight loop to the east of Platform 10a which combined with the 250 metre stretch of track through Platform 10a provides a standing "loop" of 550m to hold freight trains, which relieves congestion on the adjacent junction
- Associated equipment relocation, signalling, track and overhead line works



The benefits of the project are that it:

- Provides 50% greater capacity for trains to call at Stratford Station on the Great Eastern main line by bringing back into use the largely disused Platform 10a
- Enabled 50% more 12-car operation to Stratford Station during Games-time (only one platform could handle this before the project)
- Provides additional operational flexibility and reliability on the Great Eastern, North London Line and Lea Valley routes both during Games-time and supports the legacy objectives
- Provides additional flexibility for the movement of important and intensive freight services between the Haven / Estuary ports and the Midlands, North West and Scotland, both at Games-time and in legacy
- Platforms 11 and 12 (Stratford Station) – Platform Extensions: extending platforms 11 & 12 at Stratford Station to accommodate 8 car trains
- Disconnection of Thornton's Field: removal of the connections feeding Thornton's Field sidings; alterations to the signal equipment and control centre; erection of fencing, crash barriers and access gates
- Provision of a turn out and signalling control to serve a temporary concrete batching plant servicing the Olympic park construction, on the down Temple Mills Line 1.5km from Stratford
- Alterations to the Network Rail Overhead Line Equipment to facilitate the construction of new road-over-rail bridges 1, 2 and 3 as part of the Stratford City and Olympic Village infrastructure

Lea Valley

The Lea Valley On-Network Works project consisted of a range of works designed to support enhanced service provision to Stratford Station during Games-time and facilitate the transfer of the Thornton's Field Carriage Sidings to Orient Way. The scope of work included:

- Platforms 11 and 12 (Stratford Station) – Crossovers & Bi-Directional Signalling: provision of crossovers north of platforms 11 & 12; provision of reversible signalling on the up and down Temple Mills Line between Stratford Central Junction and Ruckholt Road junction; provision of full signalling control for the Lea Valley lines into and out of the Orient Way berthing sidings reception road
- Provides additional capacity and reliability on the Lea Valley route by enabling 8 car operation to Stratford Station
- Provides additional capacity, operational flexibility and reliability on the Lea Valley route to support the legacy objectives
- Provides additional flexibility for the movement of empty coaching stock into and out of the Orient Way sidings
- Delivers the final part of the project to safely decommission Thornton's Field Carriage Sidings

- Provided functionality to enable aggregates to be transported by rail for the construction of the Olympic Village
- Allowed unfettered construction of new Bridges 1, 2 and 3

Coventry Stadium Access Works

This small but important project improved access for spectators at the City of Coventry Stadium and included the supply, installation and handover of:

- A supplementary staircase
- Two sets of steps from the stadium car park to a subway under NR running lines

ExCel Pontoon

DLR was the primary means of spectator access to ExCel the second busiest Games venue. On its busiest day ExCel hosted 71,000 spectators. The ODA and the DLR investigated a range of interchangeable or alternative service patterns to maximise capacity.

The novel solution was the construction of Europe's largest floating pontoon to create an additional spectator route from ExCel using capacity on the DLR Woolwich branch. ExCel was already served by Custom House and Prince Regent DLR stations. The pontoon meant that Games passengers could also use Pontoon Dock station. The temporary infrastructure included:

- A navigable 180 metre long floating pontoon across Royal Victoria Dock.
- A walking route across land at Silvertown Quays
- A graded footway and stair leading to a pedestrian bridge across the North Woolwich Road direct to Pontoon Dock Station at a high level

Construction was completed in time for the World Skills Event in October 2011 which was used as a test event for the pontoon.

North London Line

In the Olympic Transport Plan, additional public transport capacity was identified as necessary between North West and North London to Stratford, to alleviate overcrowding in the central London Tube and rail system, during the Games and in legacy. The railway that runs west from Stratford Station to Willesden Junction (via Gospel Oak) was previously known as the North London Line and is now a part of the London Overground network. It serves the North London inner suburbs and allows through-journeys to Stratford and, via the West London Lines, to Richmond and Clapham Junction. The project consisted of a range of works designed to:

- Provide additional capacity and reliability on route by enabling 4 car operation (instead of the original 3 car services), at 8 trains per hour (double the original frequency) to Stratford Station during Games-time





- Provide additional capacity, operational flexibility and reliability on the North London Line route to support the legacy objectives including freight loops
- Preserves long term capacity for the present, intensive level of cross-London freight train operation

An additional legacy objective was to provide long term, increased mobility for social and new employment opportunities across seven of the most deprived London Boroughs to support the legacy plans of TfL which were identified in its Transport 2025 Vision as well as support growth in the North London corridor.

The upgrade included new signals, extra tracks and longer platforms so London Overground could operate four-car instead of three-car trains at a higher frequency and improve capacity. The London Overground passes through some of the most deprived and congested areas of London. In the long term, improvements to the service will give people who live close to it better transport links across the capital and access to the new jobs and facilities that will be created in east London.

The higher frequency service using four cars started in summer 2011.





DLR Railcars

In order to accommodate the expected unprecedented levels of demand on the DLR network at Games time, the London Bid to the IOC included an undertaking to procure 22 additional DLR rail cars to run an enhanced DLR Olympic service, which would then be available for future DLR service enhancements, consistent with the Olympic principle of providing legacy value.

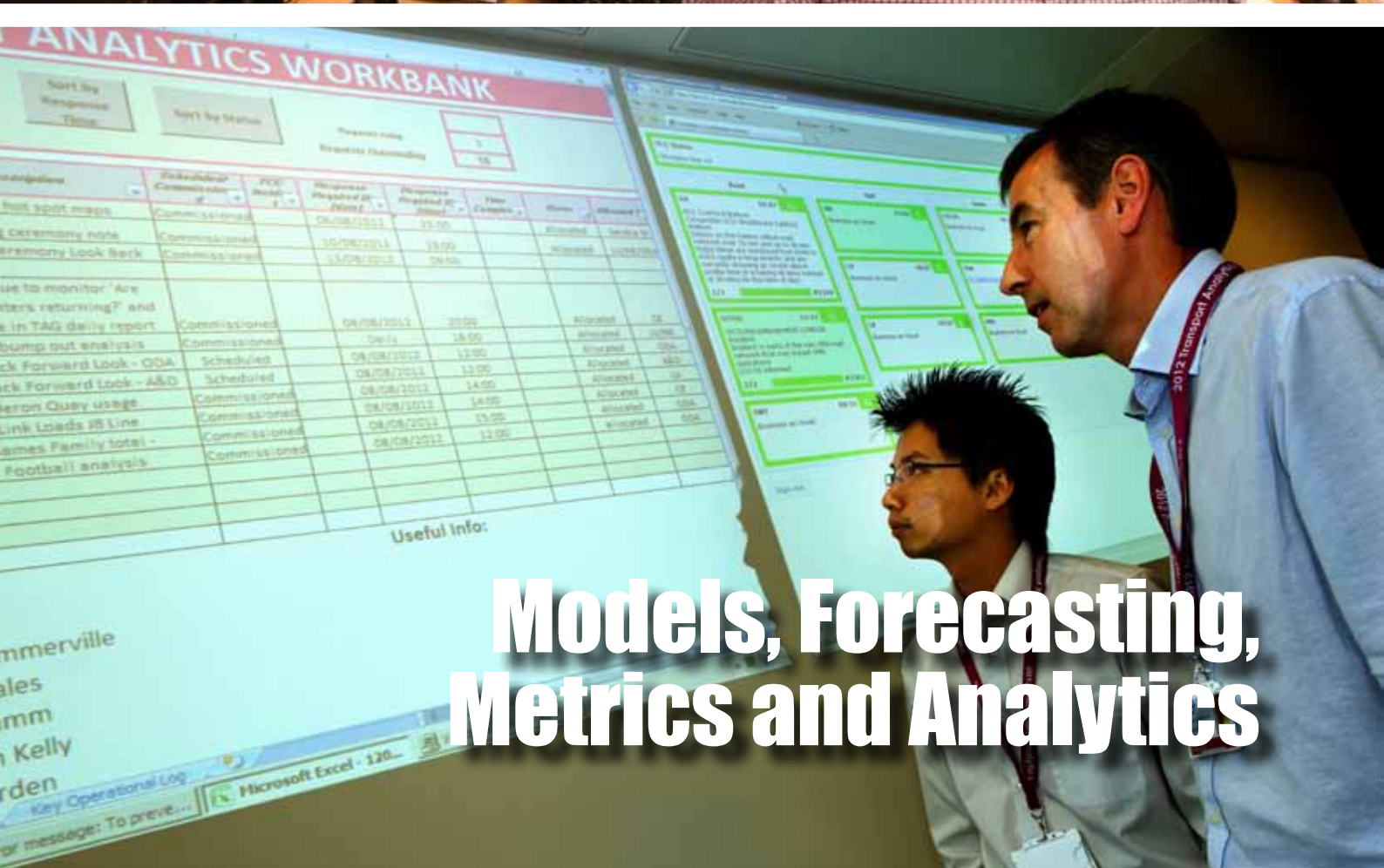
TfL were already in the process of expanding the fleet to 127 vehicles, however this would not have been enough to deliver the initial outline timetable prepared by DLR which would provide the capacity required for the enhanced service during both the Olympics and Paralympics: a further 22 vehicles were required which would result in the overall DLR fleet size rising to 149.

An agreement for the ODA to fund 50% of the 22 railcars was captured in a Memorandum of Understanding signed between the ODA and TfL.

The vehicles entered service on programme.

Key Lessons Learned

- It is important to acknowledge at the outset that projects involving a number of organisations working in collaboration will be challenging. Additional time/ budget needs to be built in to negotiate legal agreements and commercial matters, find a way to balance the various individual organisational and regulatory standards and deal with conflicts of interest
- Reliance on the use of Third Parties' knowledge of the state of their existing assets is a high risk
- Potential commercial and delay problems from local stakeholders should be mitigated by significant background research at an early stage
- Considerable stakeholder management from an early stage of any project is vital to gain early planning consent and minimise costs
- A project design team should work with the respective approval body during design, rather than present a fait accompli, which saves time and costs overall
- It helps to integrate key stakeholders in the delivery team to ensure they are fully up to speed with the project



Models, Forecasting, Metrics and Analytics

Early in the planning stages for the London 2012 Games, the ODA recognised the importance of demand forecasting and modelling in order to understand the dimensions and scale of the challenge facing the UK's transport network. To deliver the first 'public transport Games' would require a range of new operational and infrastructure improvements to meet considerable demand of moving nearly 12 million ticket holders in what was regarded to be the largest peace time movement of people in the country.

Extensive modelling and forecasting would provide the necessary information to plan for the Games as efficiently and effectively as possible. The transport domain as a whole agreed that the complexity of a large scale, multi-modal transport operation would require an innovative and dynamic approach to forecasting to meet the demand of a wide range of stakeholders. Regular revision and refinement of plans were necessary as new information became available. Analysis and monitoring continued up to and during the events themselves to provide the most up to date insights.

The wider benefits of this extensive work stream were also recognised, as fundamental information about spectator, workforce and Games Family could be used not only in transport planning but to define the design of venues and wider Games Operations from security arrangements to safety and licensing. Other stakeholders outside the Transport industry and London 2012 would also benefit from the information gathered and produced as part of the process.

The work included:

- Forecasting likely demand for spectators and Games Family transport on all modes of transport, both international and domestic
- Developing the data to inform the Transport Plan to meet these demands and leading development of the supporting operations planning process
- Development of a Paralympic Transport strategy to address its unique challenges e.g. school groups
- Leading in the sharing of transport planning information, forecasts and advice across the transport industry and other, wider stakeholders (through the data repository portal)
- Championing the development of a Games time analytics function to support real time decision making
- Regularly revisiting plans as new information became available
- Monitoring and analysing transport network performance during the Games

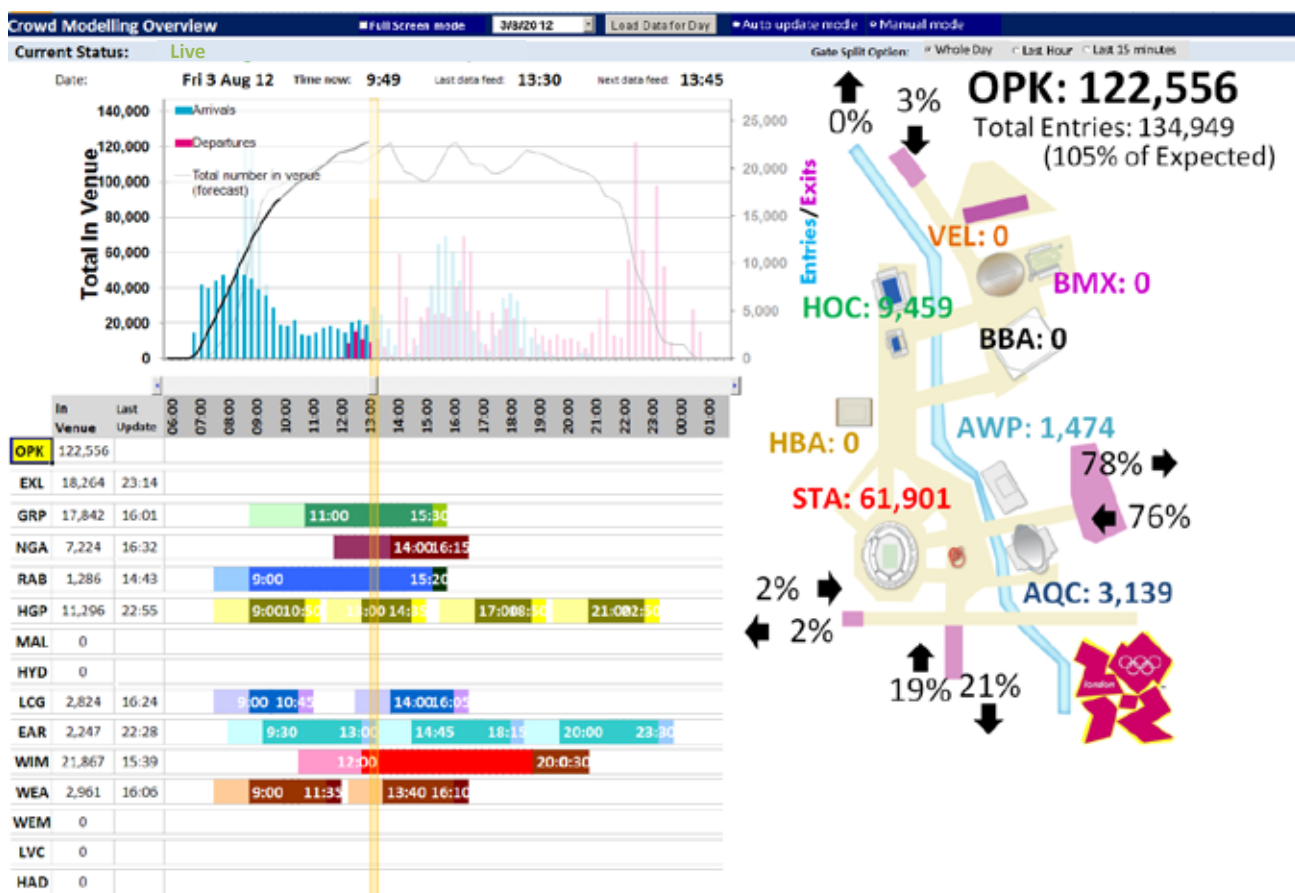
Understanding Demand through Forecasting Models

In order to deliver world class transport infrastructure and transport solutions it was imperative to provide the transport domain with a detailed picture of the challenges ahead. The complexity and scope of the necessary forecasting inspired the development of a series of dynamic and innovative transport planning models. Only through this approach was it possible to inform and assure that the UK transport network's and operators were ready to plan to meet the considerable demand and pressure of the Games.

A wide range of Games Specific modelling functions was commissioned and developed by ODA and complemented by individual transport operators modelling, Key models developed were:

- **Gravity Model.** Estimating the home and trip origins of spectators and workforce was an essential step for producing a range of models, but also had wider benefits for a number of agencies interested in population changes and people movements. For example, the National Health Service (NHS) used the data to predict how many extra people may be in London during the Games. Close collaboration with LOCOG and other stakeholders allowed for the best possible information to inform the process, including the use of ticket sales data and surveys. Crucially, this provided a robust allocation mechanism for assigning trip origins and destinations, which was essential to establish likely patterns of demand within the UK
- **Mode choice.** As well as determining likely demand on different transport modes, the mode choice model also provided an indication of which parts of the country had relatively poor public transport access, helping to define the location and scope of coach and park-and-rail services. For example, this data was important in order to establish the provision of bus shuttle services either to link with the national rail network or to dedicated car parking sites
- **Assignment Models.** Using estimates of spectator origins, mode shares and number of tickets expected to be sold at venues, assignment models were used to estimate how many spectators would use different rail/ Underground services during every day and time period of the Olympic and Paralympic Games. The main assignment model used was Railplan which is an established dynamic model used by TfL for its rail services

- **Venue Movement Model.** At a venue level, predictions of spectator numbers and behaviour helped operators to prepare for the busiest time periods. Forecasts of arrivals and departures were developed based on the competition schedule and venue capacities at each venue, and evidence on spectator arrival and departure behaviours drawn from previous Olympics and other sporting events. These assumptions were recorded in a 'Data Book' which was regularly reviewed as more information became available – and signed off by LOCOG and ODA through a working group called the 'Venue Demand Forecasting Group'. This was a two way process, as forecasts also informed changes to event timings and locations to ease pressure on Transport
- **Venue demand models** were developed which allowed for changes to competition schedules, venue capacities or assumed behaviour to be assessed and communicated across all stakeholders. These tools were used throughout the planning process for providing the scale of demand information required to scope and size the design of different venues at different times of the operating day. The models also had a role during Games-time operations, for example, to test the impacts of scenarios such as late running events and variation in spectator behaviour as a result of weather and medal chances
- **Parallel events.** The team worked closely with the GLA and their stakeholders to understand the level of demand and contributed to a multi-agency assessment of the many other events taking place over the Games period. The GLA developed the London Events Co-ordination Calendar specifically for the purpose of presenting parallel event information in a pan-London context to assist with the decision making process
- **Station modelling.** For the most critical hubs and interchanges, detailed work was undertaken to assess whether the stations would be able to handle the predicted levels of demand and if not, to develop Games-time station management plans and travel demand management targets. This included the use of a number of tools, including dynamic pedestrian modelling. For some stations, including Stratford, St Pancras and Canning Town, new models built for the Games will be available to operators to assess any future developments to the station or impacts of other unusual events. Perhaps, the most high profile modelling work featured on the Get Ahead of the Games website using a process developed with TfL called hotspot analysis. The so called "GLIM" model helped identify a grid approach for the busiest rail stations during Games time. This information was available to travellers several months in advance and allowed them to effectively re-plan their travel patterns. Undoubtedly, this was one of the most effective examples of mass participation travel demand management undertaken during the Games
- **International spectators demand forecasting.** Forecasts of International Spectator Arrivals and Departures (A&D) covered all ticketed spectators entering and leaving the country by air, sea and Channel Tunnel. Analysis was based on detailed ticketing data from LOCOG on which assumptions were agreed to estimate the total number of spectators. Other data sources included the International Passenger Survey from the Office for National Statistics, airport passenger forecasts and discussions with operators and Authorised Ticket Resellers. Estimates of maximum capacity for each mode were also developed through discussions with operators. To bring stakeholders together and share information a Symposium was held in March 2012
- **Accessibility forecasts.** Transporting nearly 40,000 wheelchair users to events would prove to be a considerable challenge for transport operators, whose networks were often not designed with accessibility in mind. Existing models were used in an innovative way to predict where the accessible travel demands would put pressure on services and stations, particularly on the TfL network, so staffing levels and other measures could be put in place
- **Group travel forecasts.** The Paralympic Games presented a new challenge as the Ticketing pricing strategy encouraged greater numbers of large groups, including school groups, to travel to and from venues on the public transport network or by coach. To estimate the volumes, timing and mode of these journeys, extensive research included detailed analysis of ticket sales and coach bookings and a random sample contact survey of over 1200 group organisers. With the insights gained from this process, the team were able to achieve a reasonable understanding of likely travel behaviour and patterns to ensure venue and transport operators were prepared to meet this unique challenge. However, direct access to group ticketholders was not possible, which would have improved these forecasts especially for non school groups even further
- **Forecasting Games Family demand.** The ODA and LOCOG developed a Games Family demand forecasting tool which was used to forecast the movement of the Games Family throughout the Games on the ORN. This drew upon data of Games Family behaviour recorded at previous Summer Games, including information collected on behalf of



the ODA during Beijing 2008. These forecasts assisted with a number of work streams including ORN design, Olympic Park loop road design and LOCOG fleet planning

- **The CORNETO model** (Combined Olympic Route NETwork mOdel) was developed from existing ODA and TfL models to provide a strategic overview of the impact of the ORN, road events/management and the venues themselves on roads in London. The strategic model was based on SATURN software that is a proprietary highways modeling tool. The model was used to inform the public facing 'Get Ahead of the Games' advertising campaign to warn road users of the likely impact on London's roads
- A suite of **local highways models** complemented the strategic view by helping to define plans around venues at a local level. The models enabled operational measures such as traffic light adjustment, lane suspensions and venue operations to be tested. The series of VISSIM and SATURN models also covered venues outside London including Weymouth and Portland, Hadleigh Farm and Lee Valley White Water Centre
- In the months leading up to the Games, TfL also completed forecasts of the likely number of unticketed spectators at Games road events such as the Marathons

Shaping the Games

The outputs of the extensive modelling and demand forecasting provided the fundamental starting point for the specification of the size and scale of the infrastructure and operations for the ODA, LOCOG and all of the Delivery Partners. Acting as a single source of information the ODA team were able to ensure consistency across all organisations and through ongoing consultation assure that data was being interpreted correctly and variations, when necessary were considered, managed and accounted for within the wider planning business case.

Assurance of statistics and modelling was provided by the Office for National Statistics, who also recommended that the ODA be the 'single source' for Games-related demand data to the transport industry and beyond.

This resulted in a 'Data Repository' service which has provided information from models or as by-products/inputs into models, to a wide range of stakeholders including the Home Office, Cabinet Office, DfT, Department of Health, Department for Culture, Media and Sport, NHS, Ministry of Defence, Local Authorities, Visit Britain, LOCOG and more.

In addition, the ODA has worked closely with LOCOG to provide a Modelling Co-ordination service, ensuring that information was shared with those who needed it across the Games.

Dynamic Games Time Analysis

During the critical phase before the Games as the project transitioned from planning to operations, information and data was continually provided to operators as more became known about spectators and their travel choices. Staff seconded to LOCOG ensured that the flow of information was maintained even during the busiest periods, allowing both organisations to benefit. A vital tool was a venue crowding tool which provided real time data on spectator numbers entering and leaving the Olympic Park and most other venues. This information became increasingly valuable to inform the transport community on the timings and volumes of moving crowds of over 60,000 at a time. Furthermore, the data provided vital insights into predicting future arrival and departure profiles, particularly at the Olympic Park. This data was used by the Games Time Transport Analytics team, jointly managed by ODA and TfL.

Games Time Transport Analytics

As the Games approached, it was recognised that despite the extensive modelling and planning before the Games, there would always be unknown factors and variables which could not be anticipated. As a result, it would be critical to monitor and assess the transport network and spectator behaviour during the Games. This would require a highly dynamic approach which would work across the transport industry and London 2012 Games Operations at venues and the Main Operations Centre.

The outcome was a Transport Analytics Group, which was set up with representatives from the ODA, LOCOG, TfL and the other key transport Delivery Partners to analyse how the forecasts would affect the performance of the transport network during the Games and potential variations.

In addition, information from forecasts was used to inform the various readiness and testing exercises leading up to the Games, to allow scenarios to be as realistic as possible.

During the Games information and key data was provided to the operators based in the TCC on a daily basis. This included:

- Performance Metrics, including a summary of passenger numbers, provided a selection of key network-wide performance indicators for the previous day. More detailed reports provided information on specific services and locations, and included comparison data against typical usage/forecast for use of Senior Transport Officers

- Look Back - Daily scheduled analysis identified any emerging trends of significance from the data. For any significant difference found, the causes and likelihood of them re-occurring were identified.

These supported responses to enquiries from ministers or media, and also informed whether deviation was likely to reoccur on future days

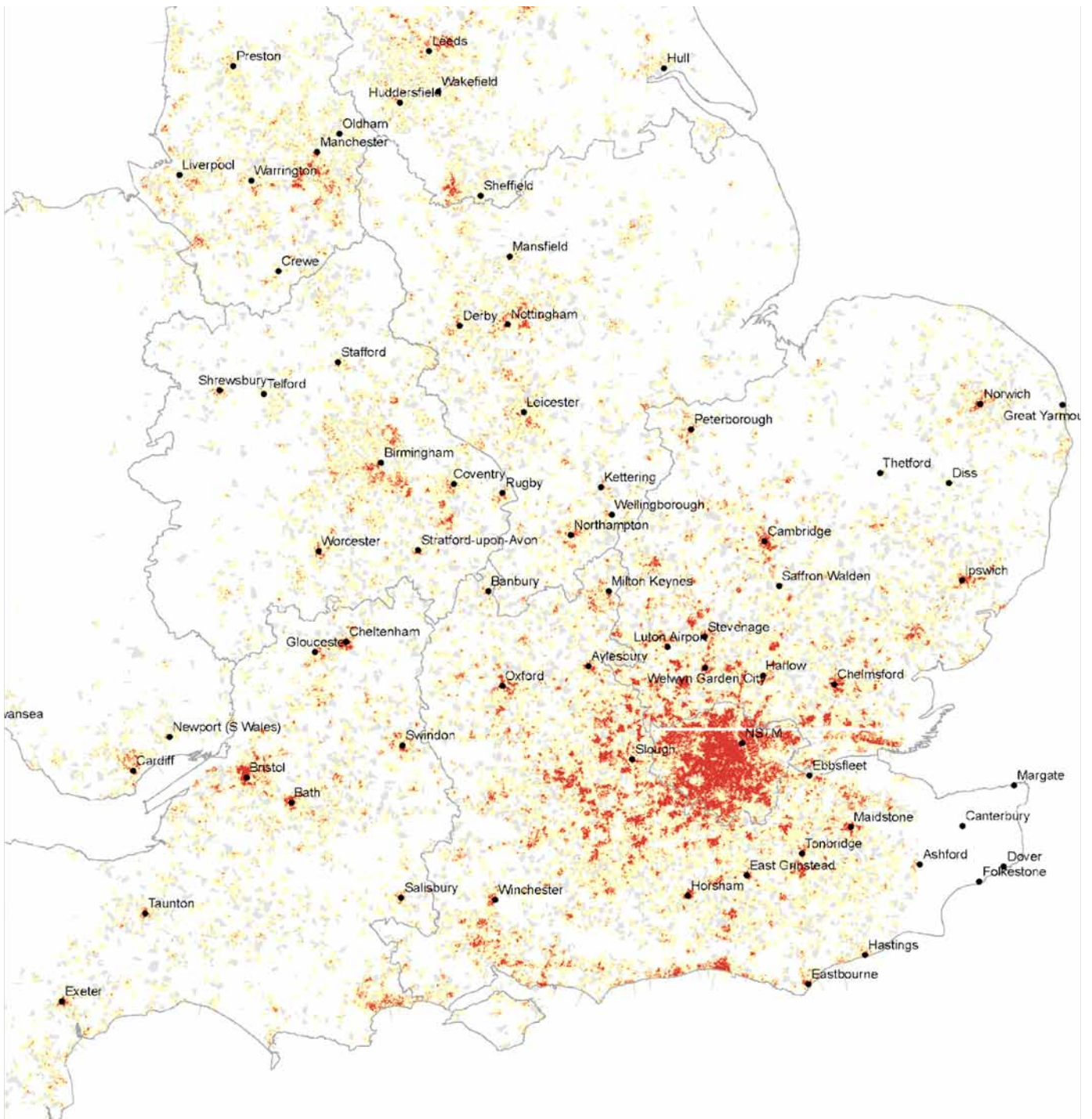
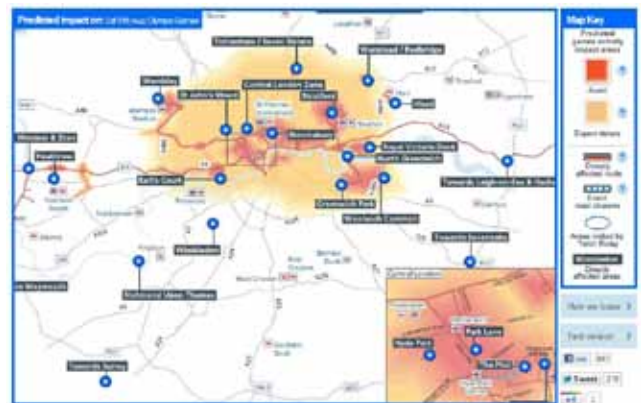
- Forward Look. The Forward Look function was a high level re-forecasting exercise based on emerging trends, events expected to occur or specific request for sensitivity tests. Potential hotspots were highlighted if these trends/ assumption materialised and when they might occur during the rest of the Games. This provided operators with an early warning of when such instances could be expected, and to be ready with the appropriate mitigation measure or response in a timely manner
- Impact Assessment / Commissioned Enquiry. The Impact Assessment function was similar to that of Forward Look but would arise as a result of an incident or specific enquiry.

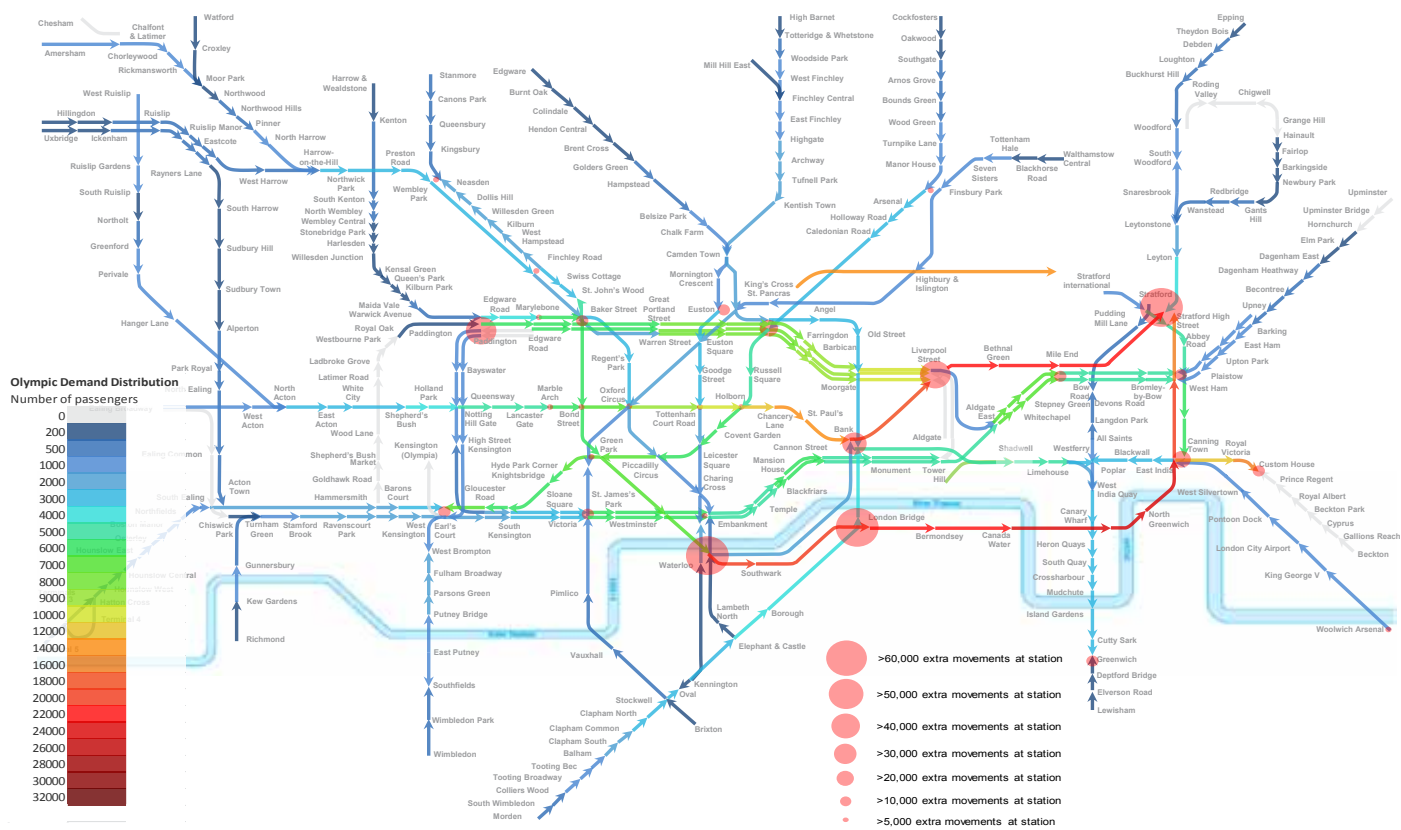
The Analytics team advised on what the impacts of an incident may be. For example, if a particular line on LUL became unavailable during the Games, Analytics provided advice on the impact on spectator travel, and if the rest of the system could cope if the station remains closed for the medium and long term.

- Venue based analytics. As well as the core team based in the TCC, analytics provided sub groups at two key venues, the Olympic Park and ExCel, as well as an overview of other venues in the Main Operations Centre. These groups captured data at each venue on spectator demand levels and behaviour. A system was developed to provide a live feed to the various operations centres providing real time information on spectator numbers, and a solution was deployed to monitor spectator behaviour and flows in and around venues/key transport hubs.

Analysis of trends was used to predict the impact of any observed difference in behaviour on future days, which was used both by the Transport operators but also the venues themselves.

This information was used to re-forecast the Paralympic Games using data/observations made

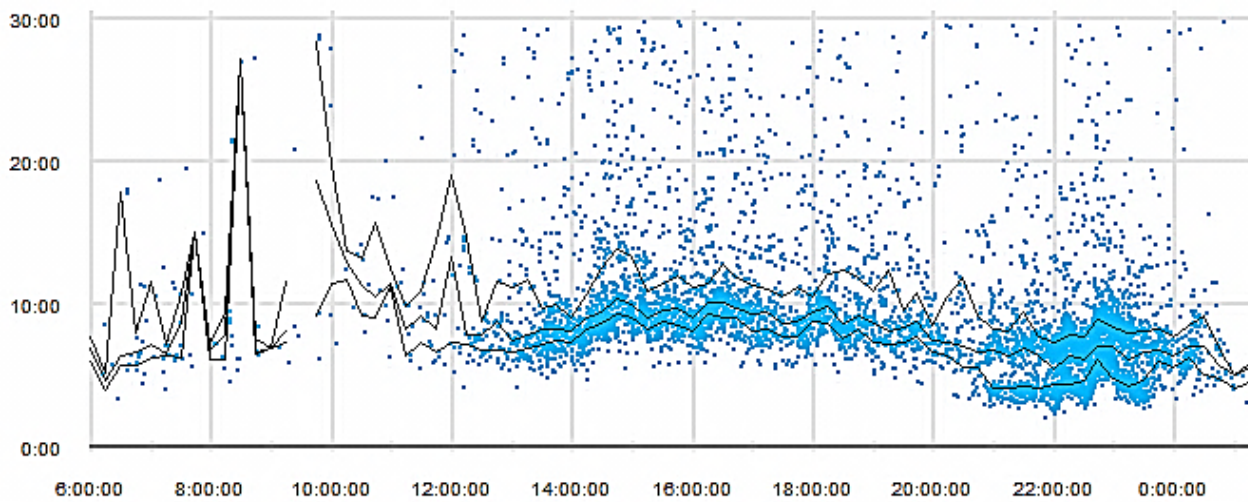




Journey Time Analysis

Journey Time

Stratford Gate, All Exits to Stratford Regional, All



- International Transport. To facilitate the delivery of a successful and positive A&D experience for all international spectators the ODA jointly worked with partner agencies to plan, develop and deliver the A&D Hub (A&D Hub). The focus during Games-time for collective action and information-sharing between those agencies within Government and beyond that were involved in delivering this objective

The Benefits

This unprecedented level of planning, research and preparation helped to ensure the delivery of a truly successful 'Public Transport' Olympic Games across one of the most complicated transport systems in the world.

The extensive modelling and demand forecasting work helped the key transport partners and the multiple additional agencies involved in the delivery of transport for the Games to take a fully integrated approach across all modes, ensuring consistency in planning and shared access to the most up to date planning material.

One of the main successes was the ability to monitor in real time how closely forecasts matched reality. This enabled early warning on potential issues from trends observed. This dynamic approach to planning, with constant revision of plans in response to observed changes to key variables such as spectator behaviour, proved highly valuable in an operational environment.

However it is important to remember that modelling and forecasting are fallible – they should not be relied upon as the one source of truth. For instance, spectator travel forecasting for London 2012 proved to be inaccurate – the pattern of demand was not as expected. By the time a 'late purchase culture' had become clear, it was too late to change the ticketing strategy. In the event the impact of this discrepancies was not a major issue and if it had become so, numerous contingency plans were in place to deal with unexpected developments of all kinds. Without such contingency planning, though, over-reliance on the forecasting could have had serious effects.

Key Lessons Learned

- Identifying requirements and building the necessary relationships as early as possible is critical to ensure the best possible information is available
- The information used for modelling is by its nature uncertain and can be affected by numerous variables. How effective modelling is, depends on understanding of the context. Robust contingency plans need to be in place to address emerging data
- Regular revisions, refinement and consultation on modelling was important so users understood the limitations and could prepare appropriate contingencies
- The scale and impact of the Games on transport required modelling covering almost every mode of transport. This complexity required wide stakeholder input and consultation, and regular revision of forecasts and plans from the early stages of planning through to the Games themselves
- Demand forecasting and modelling can have far wider benefits beyond the Transport sector, however, this must be carefully managed to ensure stakeholders understand the context
- Planning does not necessarily stop once operations begin. Vital information and lessons can be learned early on during the operational phase by monitoring and analysing events as they unfold, which operators may not have the time or capability to undertake themselves



Public Transport

London 2012 was to be the Public Transport Games. All spectators would arrive at venues by some form of public transport, with the exception of a small number of blue badge holders. Consequently a public transport strategy was required that would deliver some 9m spectators by rail to the Olympic and Paralympic Games, accounting for some 80% of all spectators.

It was recognised that most spectators travelling to the Games were likely to use a mix of National Rail and TfL modes of transport.

Several years of planning identified and arranged the specific step changes required that would deliver the changes necessary to carry spectators.

Rail Strategy

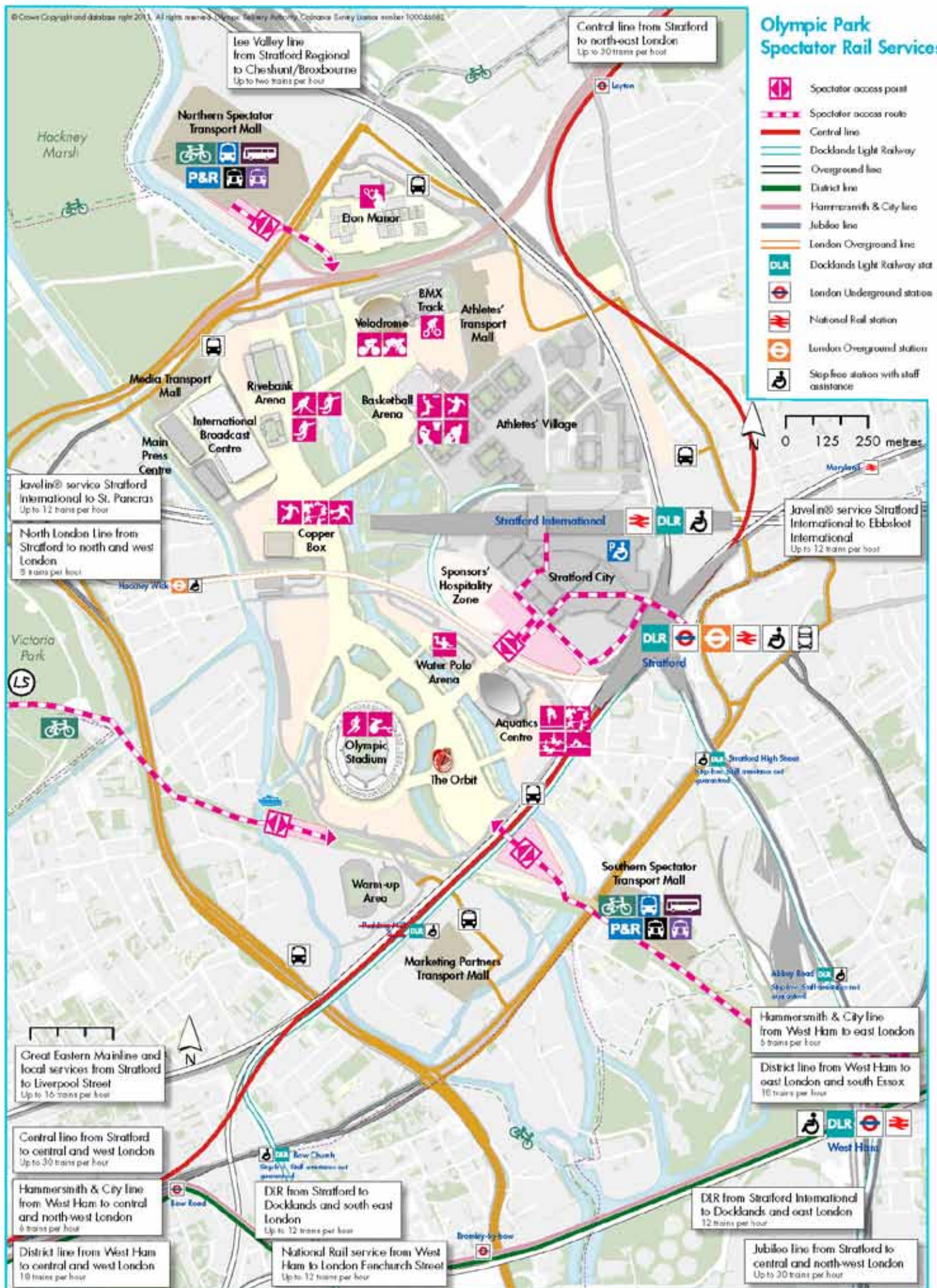
The Transport Delivery Partners worked together to deliver the aspiration for a public transport Games by providing capacity and services to transport spectators to and from the sporting venues. These additional services and capacity were delivered whilst minimising the impact on background demand using existing TfL and TOC services.

Planning for rail demand started early in recognition of the long lead times for service planning and infrastructure works, working with normal industry processes as embodied in the national rail Network Code. The formal Network Code process takes 67 weeks. But major changes were discussed with the industry much earlier at the annual timetable conference. The National Rail train services for 2012 were first discussed at the 2006 timetable conference.



The overall rail strategy contained the following elements:

- Later last trains from London terminals for spectators returning from the Olympic Park and other London competition venues. Key trains operated at maximum length to maximise capacity. For example, the DLR network was upgraded where required to enable three-cars operations on all lines. Additional late-night services to main centres of population broadly within a two-hour journey of London included Cardiff, Bristol, Exeter, Sheffield, Leeds, York, Birmingham, Manchester and Liverpool.
- A train plan that maintained services for regular travellers during the Games
- Provision made within the majority of London train operators for strengthening of existing services to increase capacity, mainly focused on off-peak and weekends
- Late-night services to allow spectators in the Greater London area and the south-east to get home by public transport
- Provision of a third peak service on London public transport network
- Provision of 'standby' trains on some National Rail routes to cater for over-running events and higher than predicted passenger demand
- Some additional earlier Sunday morning services on key routes into London
- Operators undertaking early maintenance to rolling stock and infrastructure to provide enhanced levels of reliability during the Games
- Enhanced response to operating incidents with a focus to restore service in the fastest possible time



- A particular focus on passenger information with investment in an additional 300 'OIS' customer information screens at stations in and around London, supported by a sophisticated real time information architecture with TCC at its heart

Negotiations took place with a wide number of stakeholders with a view to establishing Games time agreements on delivery requirements. Stakeholder negotiations and agreements covered:

- TfL – London Underground and London Overground
- NR
- High Speed 1 and 17 other Train Companies
- DB Schenker for running Olympic contingency service
- DfT on a number of agreements
- ATOC in connection with Travelcard, Journey Planner, Games rail tickets and temporary changes to the regulatory regime for punctuality

Legal agreements entered into with these stakeholders and extensive modelling was undertaken to identify demand expectations.

Station surveys were undertaken to identify changes required at Games time and lead development of detailed station operation plans for venue stations and key interchanges.

The rail operators (TOCs, TfL, NR) needed to change their operations at Games time:

- Services needed to operate later than usual and there needed to be more late night services
- Timetables needed to recognise the Olympic and Paralympic venue locations which created a different geographic demand from usual
- Timetables and train capacity needed to recognise very different demand profiles at the weekends
- Possible capacity increases during the day needed to be achieved primarily by longer trains rather than timetable change
- Additional train services running a third peak, additional early morning and late night services required changes to the normal infrastructure maintenance arrangements
- All services needed to be as reliable as possible to maximise the capacity available.
- Station operations in many locations needed to be enhanced to deal with the increased passenger volumes of Games locations
- Station Wayfinding and Signage needed to be fully integrated with Last Mile and Central London Zone

Operators consulted early with their workforces to minimise the risk of any industrial relations questions associated with Games-time operations





and real time management of network capacities and routing was influenced via TDM.

The TCC co-ordinated and monitored network performance overseen by the STOG.

Overall, around an additional 18 million seats were provided by train operating companies during the Games. Significant additional capacity was added during the Games themselves in response to unexpected patterns of demand.

Major schemes for the Olympic Park, including National Rail services, London Underground and London Rail services, played a key part in delivering spectators and Games workforce and volunteers to competition venues and cultural events across the UK and London. Three stations – Stratford Station, Stratford International Station and West Ham Station – were identified as key access points to the Olympic Park with a total of 12 different rail services running through these stations.

Stratford Station is a major public transport interchange that allows passengers from east of London to travel to Canary Wharf without travelling into central London, as well as providing interchange opportunities for passengers using National Rail and Underground services from central London.

Before the Games 55,000 passengers passed through Stratford Station in the morning peak period and an additional 63,000 spectators were expected to use the station each morning during the Games, bringing the number of people passing through Stratford in the morning peak period to 118,000. The station's comfortable capacity was 37,000.

The ODA funded improvements to Stratford Station including nine new lifts to make all station platforms fully accessible; reopening a disused

subway to create additional access to platforms and make it easier to change between rail, Underground and DLR services; a new westbound Central Line platform; lengthened and widened platforms to increase capacity; and a new station entrance at mezzanine level to improve the flow of passengers.

The intensity of the third peak service on London Underground meant that some changes were made to the power and control systems. Additional power wiring was installed at the east end of the Central line, and additional cooling was installed in Holborn substation, also on the Central line. At Aldgate the signalling computer was upgraded to enable general timetable load and trip editing capacity enhancements in order to allow the volume of trains that later operation demanded to operate on the Circle, District, Hammersmith & City and Metropolitan lines. These improvements have a legacy benefit in allowing more trains to operate in the late evening on these lines.

The Javelin® rail shuttle service was one of the celebrated modes of transport for the Games, providing a high speed rail link between St. Pancras International to Stratford International in seven minutes, and then onto Ebbsfleet with a service frequency of up to ten trains per hour. Each Javelin® service provided a capacity in excess of 1,000 spectators per train. The record was 28,000 passengers from St Pancras to the Olympic Park in single morning 'bump-in'. In fact, by making the Javelin® a flagship service in the early days of the Games, it became almost too attractive. Surveys began to indicate that it was drawing significant demand from other equally convenient national rail routes to the Olympic Park from Liverpool Street and Fenchurch Street. Its prominence in media campaigns was lessened as a consequence.

St. Pancras International station was a key transport hub with four National Rail operators using the station; East Midlands Trains, First Capital Connect, Eurostar and the Southeastern high-speed services (Javelin®). The movement of spectators plus normal rail traffic required temporary works to keep the station operation highly effective and the ODA worked with all rail parties and many other key local stakeholders in order to deliver a safe and efficient operation.

In order to maximise the utility of the high-speed link at Stratford International Station, additional infrastructure work was undertaken. This work included new access arrangements at the eastern end of the station, platform works to enable domestic trains to call at the international platforms and ultimately the provision of Games-time spectator circulating areas. OPTIC was established to control passenger and spectator movements to/from the station during the Games.

Temporary works were required at Ebbsfleet International to facilitate the flows of international and Games passengers. International visitors travelling to/from Stratford were able to interchange at Ebbsfleet International to join one of the Javelin® services for their journey to the Olympic Park.

Work carried out at West Ham station provided new passenger links that allowed spectator access to the Olympic Park along The Greenway. The Greenway is a public walkway which was used by spectators accessing the Olympic Park from West Ham station. The ODA worked with the London Borough of Newham and London Underground to enhance access between the District line and Hammersmith & City line platforms, which was used by the majority of spectators using West Ham station to reach the Olympic Park.

The West Ham station scheme created a new high capacity walking route for spectators from the District line and Hammersmith & City line platform to leave the station and on to The Greenway. The Greenway itself was upgraded as part of a non-transport ODA project. This increased its pedestrian capacity and made it a much more pleasant environment.

The North London Line underwent two significant changes in preparation for the Games. The first consisted of converting the section of the line between Stratford Station and Canning Town Station from National Rail to DLR operation, extended from Stratford Station to Stratford International Station. The second change included new terminating platforms for the North London Line at Stratford Station. As a result, four new stations were created on the DLR network: Star Lane, Abbey Road, Stratford High Street and Stratford International. The converted route also served the existing stations at Canning Town, West Ham and Stratford Regional. New DLR services were introduced between Stratford

International and Woolwich Arsenal stations, and between Stratford International and Beckton stations. North London Line National Rail services to the west of Stratford became part of the TfL, London Overground network from November 2007.

The DLR provides a fully step-free transport service in east London. TfL increased the capacity on the DLR service through a 2.6km track extension from King George V Station to Woolwich Arsenal, lengthening of platforms and the procurement of an additional 55 rail cars to enable a three-car service.

A range of other temporary and permanent station enhancements were also provided to benefit those people using the rail network during the Games. For example, temporary and permanent lifts were constructed at Prince Regent Station to enable the circulation of spectators between the platforms and the ExCel venue. Permanent enhancements include the refurbishment of St. John's Wood Station, the modernisation of Highbury & Islington station and accessibility improvements at Weymouth and Windsor & Eton Riverside stations. Two 'fireman's lifts' were brought in to public use at Westminster and North Greenwich stations to accommodate mobility impaired demand, whilst boarding ramps for wheelchair users were introduced on the Underground as a temporary scheme, which is now being continued.

Rail Outside London

Unlike the London Underground and London Overground, national rail services are provided by different operators on a geographic basis under franchise to the DfT. The Games impact on individual operators was different. Southeastern substantially changed its operations to allow the stock used on the High-Speed Kent commuter services to St Pancras to be adopted for Javelin® operations .



Abellio operates the Greater Anglia services, and National Express c2c services and these served two of the three Olympic Park Gateway Stations which could expect heavy spectator demand for the Olympic Park. Long distance operations saw increased demand from spectators wishing to make trips to London with a proportional increase in long distance day trip journeys given availability of accommodation in and around London.

The ODA specified additional early and late running on longer distance services to ensure spectators could make the round trip from major centres of population broadly within a 2 hours travel time. In addition it put in place a contingency train service at four main London termini in case an event ran late and last scheduled trains had departed.

Minimum Intervention

With three exceptions, franchise agreements contained a clause that required the operator to co-operate with the ODA and provide additional train service or capacity. The original spectator demand forecasting work the ODA undertook enabled a Games-time forecast to be provided on a TOC by TOC basis. Postcode data was also shared with TOCs to enable them to target venues and cities with high numbers of spectators. For the most part, the simplest way to improve capacity was to maintain peak time train lengths during the day. While this is an over-simplification of the solution, it had the advantage of:

- Not dramatically increasing the number of train paths
- Not requiring additional drivers
- Not requiring a completely new timetable
- And consequently, not being unduly disruptive

Many competition sessions were scheduled to finish beyond 22:00 so some additional late night capacity was required. Both DLR and London Underground services operated until approximately 01:30. National rail services also ran a significant number of additional late trains, beyond the usual last timetabled journey. Contingency trains were on standby for exceptional circumstances.

However, despite the careful planning that preceded the Games, considerable flexibility was required from the TOCs in adapting services to actual demand patterns as they emerged during the Games. This resulted in significant additional strengthening of train services, particularly on weekend mornings.

The net impact of what could be described as 'minimal intervention' policy towards train operations delivered good value for money, was simple to operate, was extremely resource efficient and was low risk. It required minimum change,

was relatively easy to switch between normal to Games-time operating mode for the Olympic and Paralympic Games, and was less disruptive to the TOCs than some alternatives. This approach also kept disruption to a minimum for those using the services who were not travelling to or from the Games.

Rail operators brought forward maintenance on all assets, depending on their criticality, from points to heavy maintenance on rolling stock, to deliver an increase in availability and consequential capacity at Games time. Considerable investment was also made in resilience and fix-time improvements and was central to the TOC's Games-time planning.

Station Operations

Even during existing peak periods, most stations have a steady, if heavy, flow of people, though generally in one predominant direction. At some locations, this regularly requires crowd management measures to be introduced. All London Underground and LR stations, all of the NR terminals and the busier TOC-managed stations have contingency plans to manage congestion. Specific arrangements for the Games-time overlay were developed with the appropriate operators on a station by station basis.

For many stations, there was little or no change to normal operations. For others, the impact was high. Some stations presented unique and specific issues.

For example, London 2012 promoted accessibility and inclusion. But while a growing number of stations and new rolling stock are being made accessible, the rail network is still some way from being fully accessible. Additional access facilities, such as lifts, ramps and personal assistance, were all part of the plans that were put in place at a number of stations for the Games. The ODA, TfL, TOCs, the DfT and others all contributed financially to an improved passenger assistance booking system for rail 'Passenger Assist' which successfully supported over 13,000 assistance bookings in London and at other venues/stations during the Games period.

With four train operators (with a total of seven routes) sharing its facilities, Stratford Station was used by the majority of Olympic Park spectators, operating near capacity during the entire Games. Although the station has its own control rooms, the demands of the Games required a higher level of co-ordination, including a strong rapport with the Olympic Park team to safely manage the arriving and departing masses between the venue and the station.

To facilitate this, the ODA in conjunction with LOCOG created the OPTIC that allowed all operators to liaise face to face in a co-ordinated way at games time across all three Olympic Gateway stations.

Co-ordination of the movement of spectators to and from the three stations serving the Park – Stratford Regional, Stratford International and West Ham - was facilitated by OPTIC. If one or more stations started to become overcrowded, OPTIC would help inform the spectators to use an alternative station; however, final decision remained the responsibility of the operators.

Station plans actively considered the impact on staff of working at peak hour conditions for the whole of their duty. Hence, additional staff were recruited from back office functions, while TfL, NR and TOC's Travel Ambassadors were located on stations and identifiable by their pink tabards, allowing 'orange tabard' station staff to get on with maintaining operations and 'green tabard' staff to work on safety and security. The use of coloured tabards also added to clarity at busy times as all staff (as well as customers) could easily identify the roles of different people.

NR developed, alongside the operating partners, the station operations plans for key stations and incorporated outputs from working groups like the wayfinding and signage group.

Other key elements of the work on the rail strategy included:

- Customer Experience Plan
- Overseeing Signage & Wayfinding
- Ensuring security plans developed for transport during Games

Bus Strategy

TfL is responsible for planning and securing the local bus network within the Greater London area, through the provision of service contracts with bus operators who deliver services according to its specification. The network is comprehensive and operates 24 hours a day on many major routes which makes it far more extensive at certain times of day than other modes.

The use of TfL buses during the Games was not intended to be for mass movement of spectators, as this function was performed largely by rail. However, buses provided a significant local facility, including for those working at and around Games venues. TfL buses were included within the Games Travelcard for spectators and, where applicable, Games Family.

This approach of augmenting the already comprehensive network in London was intended to maximise the usefulness of the whole bus network for passengers by ensuring that the planning and provision of additional services was integrated into the wider process of London Buses operations.

Some adjustments to bus service alignments caused by Games-time operation was necessary. The bus strategy developed by TfL focused on maintaining the bus network, adjusting it to fit the Games-time need. The core objective was to create a network that works while identifying the sections which could benefit from additional capacity over and above the existing provision, at the same time as managing the myriad disruptions caused by all the road events.





Whilst challenging, TfL and LOCOG worked closely together to ensure that all Games workforce could reach their operations venue on time. Due to the early start of the Games operations, this was especially difficult at certain locations; however, it was successfully delivered by a combination of London Buses, London Underground, London Overground and special arrangements put in place by LOCOG.

Real Time Flexibility of the Public Transport Network

Whilst demand forecasting played a pivotal role in determining the strategy and overall planning of transport services, there were inevitably limitations during Games time operations. For example, demand and patterns of travel to football stadia was naturally influenced by the outcome of the results from the preliminary rounds themselves. This led to many spectators buying their travel tickets on the day, rather than in advance. A high proportion of rail trips to several of the regional football stadia venues originated in London. On a number of occasions, additional resources were provided at short notice and contributed to alleviation of any serious issues at the end of Games for journeys returning to London.

Train companies worked quickly, flexibly and cooperatively to augment capacity at short notice, providing significant additional services. This was co-ordinated by ATOC, working in close co-operation with NR and the ODA.

In addition, TfL provided a contingency fleet of 50 buses which were deployed on various occasions during the Games, e.g. in case of late running of events (which occurred on several occasions) and in support of other service providers.

ODA Directly Managed Bus and Coach Services

In recognition of the fact that for some, rail may not be the most convenient or practical choice of mode, the ODA provided a network of 2012 Games coach services. The services provided direct links to the Olympic Park, Ebbsfleet, ExCel, Greenwich Park and Weymouth and Portland venues. Buses and coaches also provided an important support function at some competition venues, providing park-and-ride services locally, and also shuttle services to connect nearby rail stations to the venue entrance.

For many disabled spectators, a direct coach route provided the easiest journey to a Games venue. The ODA worked closely with First Group, the Games bus and coach operator, to create both an accessible booking service and operation.

Park and Ride to the Olympic Park

Even with a comprehensive rail network and additional coach services, it was acknowledged that there may be some spectators who could find it difficult to make their entire journey to and from the Games by public transport. As another alternative, a number of park-and-ride sites were provided for those travelling into the Olympic Park from the North, north-west and north-east London, and the South East of the UK. Sites were carefully chosen, taking into account a wide range of factors, including the expected demand on the local road network, the availability of spaces and the cost effectiveness of the infrastructure and the work required.

Car parking spaces were provided at a modest cost with coaches or buses operating regular shuttle services taking spectators directly from Thurrock or Hertford to the Olympic Park. A park and ride facility was also provided at Ebbsfleet International where spectators travelled to the Olympic Park on the Javelin® service.

At some venues outside the Olympic Park and particularly outside London, the use of public transport directly to events is more challenging. However, to encourage as much of the journey to be made by public transport as possible, local park-and-ride services were also provided.

Taxis

Taxis (black cab) and private hire vehicles were required during the Games where individuals required a level of flexibility not offered by public transport modes. In particular, taxis provided an accessible travel alternative for those with special needs and impairments.

Working with stakeholders, the ODA and TfL ensured that the latest good practice guidance for the integration of taxi ranks and pre-booked taxi and private hire vehicles was used when designing venue transport infrastructure. TfL leads on taxi facilities at rail interchanges in London and liaised with the taxi industry to ensure that the requirements for the Games were taken into account.

Taxi, pre-booked taxi and private hire were able to pick up and drop off at specific zones at all of the Games venues. Facilities were also provided at most public transport interchanges.

Competition Venues

LOCOG was responsible for the planning of transport to serve all the client groups attending competition venues.

A range of temporary, site specific measures were required to meet the objectives for spectator transport for the Olympic and Paralympic Games. Measures put in place at each venue included:

- Shuttle bus services from rail stations to the venue
- Park-and-ride operations, including remote car parking, shuttle bus services and load zones at both ends of the services
- Temporary traffic management and parking restrictions on the local street network around venues which were developed by TfL and London Boroughs
- Pre-booked accessible car parking for disabled spectators
- Drop-off and pick-up facilities for accessible bus services
- Cycle parking facilities
- Load zones and parking for spectator coach services
- Load zones for taxis and private hire vehicles

- Pedestrian access routes, including temporary track way
- Boarding and alighting facilities for river services; and
- Temporary signage

Careful analysis was undertaken by LOCOG and TfL to understand the pedestrian crowd movements at competition venues and key transport interchanges to ensure that the predicted levels could be safely accommodated and appropriately managed. Detailed simulation modelling of crowd movement was also used to help design venues and develop appropriate Games-time operating plans.

To inform the planning process for the Olympic Park, the Games-time crowd movement implications for this area were considered in detail. This work ensured that the infrastructure plans and designs of the Park were developed with Games operations at their core.

Ticketing

Free London travelcards were provided to each ticketed spectator by TfL and the TOCs and distributed in conjunction with the Games tickets. Games transport tickets for travelling outside the London area were produced and were made available for purchase from July 2011: however



sales remained low in relation to forecasts for all modes, until very close to the start of the Games.

The strategy was designed to encourage spectators with Games tickets to book their travel tickets in advance but although bookings were steady, with increases following direct e-mails to Games ticket holders, bookings across all modes were low. By the end of 2011 only about 3% of forecast passengers had booked onto National Rail services, for instance.

There was a concern that if the low volume of sales continued it could cause issues with fulfilling the late rail ticket demand, together with logistical/practical issues at stations and park-and-ride sites and reputational issues as a result of spectators purchasing higher priced 'normal' tickets during the Games together with any contractual impacts.

Consequently early in 2012 a dedicated programme was put into place to increase transport ticket sales. This included higher profile direct e-mails from LOCOG, ATOC and the TOCs together with increased encouragement of rail companies and the directly managed coach supplier to promote their services in other ways.

An analysis of the actual Games ticket sales allowed more robust forecasts to be developed and highlighted the greater than anticipated travel demand from London and the South East. Further work was then carried out to fine-tune forecasts and ensure that marketing was targeted as effectively as possible.

This included train company and ATOC media relations, radio and poster advertising, radio and television interviews, press releases by ODA and ATOC and social media. A number of targeted advertising campaigns encouraging people to buy their transport tickets were launched for particular areas and venues using high profile athletes / personalities. The success of the campaigns varied, but irrespective of the interest generated, increases were always short in duration.

However, demand for rail tickets began to increase significantly about a month before the Games and continued throughout the Games. By the end of the Games, ticket sales were around 85% of the revised target.

Directly Managed Transport Operations Centre services remained well below those forecast, highlighting the need to reduce the numbers expected during the Paralympics.

Key Lessons Learned

- Need to approach the challenge by starting with looking at what has to be delivered and developing a bespoke and integrated response, rather than using existing planning tools
- Ensuring minimum change to existing process and practice saves time, cost and risk
- The earliest possible start is essential
- Strong key holder relationships are critical for delivering change on this scale
- It is important to have a central co-ordinating body able to: challenge proposals; bring together different transport operators to work in a unified manner; ensure value for money
- Never take for granted data analysis results. Retain enough flexibility in the specification to be able to adjust provision to meet short-notice changes in forecast demand
- A clear understanding of brand protection guidelines in order to develop Games-specific travel products, resulting from sponsorship and brand protection on Games travel ticketing is needed from the outset
- Spectators are likely to leave travel arrangements to until very close to the start of the Games and planned ticketing arrangements should allow for this
- The Olympics are fundamentally different to other sporting events and therefore the experience of previous spectator behaviours is not necessarily indicative of their Games time behaviour





Customer Experience

The ODA worked with transport operators to develop and deliver a customer experience strategy that would unite the industry behind the One Team Transport concept. A senior cross-industry customer experience group chaired by the ODA was set up to design the core overarching Games-time travel Customer Experience Strategy so that operators could then incorporate it into their own plans. The Customer Experience Strategy comprised three critical components:

- Hearts and Minds – staff involvement engagement and advocacy, to ensure highly visible customer facing staff who felt supported, were well trained, equipped, games literate, involved and engaged, and empowered to deliver superior customer service. These customer facing staff, volunteers and travel champions would be instantly recognised through magenta uniforms
- Brilliant Basics – customer service wholly integrated for the delivery of excellent operational basics, so that the Games were all about sport, not transport. Games way-finding and signage would share the consistent magenta theme to ensure spectators could navigate London and venues more easily
- Magic Moments – to delight customers. Core magic moments were identified as things everyone could sign up to, but the industry also committed to do some special things over and above these and appropriate to their organisation

There was a shared view across the industry that the core overarching Games-time customer experience strategy should cover all customers travelling at Games time, so that it would be a positive experience for everyone, not just ticketed spectators. This would actively enhance the excitement and sense of occasion on the way out to events, and maintain a sense of a good day out

on the journey home. It would also avoid creating a “two tier offering” and ensure that even if spectators could not be readily identified (going to events in Central London or visiting live sites, shops or other attractions before or after their event) everyone would receive a consistently good experience.

Hearts and Minds

- ‘Welcome to London 2012’ Training was collaboratively designed and developed with the GLA, adopted as the minimum standard for all operators, and incorporated into all customer service, Olympic readiness and engagement programmes. Welcome to London Training was delivered to more than 30,000 people across the transport industry. ODA wrote the transport module for the training given to London Ambassadors and others across the service industry. As a result of Welcome to London being rolled out across transport and other service industries, the narrative on Games time transport, the Games and London was consistent and commonly owned
- Magenta London 2012 tabards – 20,000 specially designed Games time travel tabards were provided for customer facing staff and volunteers. NR Travel champions wore a bespoke uniform in a magenta colour scheme, as did GLA Team London Ambassadors
- Pin Badges were provided for 90,000 staff, to recognise their part in a once in a life time event
- Games Time Transport Handbooks – 80,000 produced and provided in hard copy to frontline rail staff, ferry companies, airlines, TCC, GLA and others as part of the tools and resources available to staff at Games time. An electronic version was also available, and staff were encouraged to keep their copy as a souvenir of the Games
- Leadership - each operator put in plans to ensure leadership was highly visible to staff, volunteers and customers
- Employee well-being – each operator undertook to ensure appropriate breaks, rest and shift patterns, to ensure staff maintained energy and focus on the customer

Brilliant Basics

- Games Time travel card for London event ticketholders, to ensure an efficient and integrated spectator experience
- Wayfinding and signage was significantly enhanced across the public transport network for Games time, and had a consistent magenta theme, giving a coherent look and feel to customer service and information
- Customer Service Plans were fully integrated with Business Plans, Olympic Service Delivery Plans and Games-time station operating plans. Operators produced customer service plans and submitted assurance statements against every element of the Customer Experience Strategy
- A One Team approach was adopted at key interchanges between different modes, and services and local delivery plans were put in place
- Customer information was strengthened to deliver real time information, and communication plans were put in place to ensure consistent messaging at the operational level

LOCOG’s Spectator Experience Surveys showed spectators were generally very pleased with transport in London during the Olympics, and with information about travel:

- Around 80% of spectators in the Olympic Park thought that the ease and efficiency of public transport around London was extremely good
- More than 80% of spectators at ExCel or Greenwich Park felt the same
- Around 80% of spectators thought the ease and efficiency of transport getting home after their event was extremely good

Finding information about how to travel to the Olympic venues was also felt to be very easy, with over 80% scoring this 4 or 5 on a scale of 1-5.

Similar feedback was received for the Paralympics, where over 80% of spectators found the ease and efficiency of public transport around London extremely good. Moreover, over 80% of spectators found accessibility for those with a disability or mobility issues was extremely good.





Magic Moments

The core magic moments that transport operators signed up to were:

- A sea of magenta – a symbol of one team transport in action
- Joining up all volunteers across all organisations to deliver seamless customer experience
- Games themed announcements
- Proactive, happy, empowered staff
- Top management visibly demonstrating the One Team ethos

A Highly Successful Sea of Magenta

The sea of magenta approach was stunningly successful. Transport staff volunteers, augmentees and ambassadors all delivered superior customer service.

There were magicians on trains, thousands of ice creams handed out every day, Britpop lollipops handed out by London Overground, pin badges handed out to children and collectors, and a very positive perception of public transport. There was even a fashion article in Cosmopolitan on Olympink!

Customer assurance statements were met and exceeded, and evidenced through Games-time monitoring and evaluation and photographic evidence.

Feedback from spectators and visitors was overwhelming on how transport exceeded their expectations and how impressive transport customer service was.

The strategy was fine-tuned for the Paralympics, and one or two locations were reviewed, but the core strategy worked and exceeded expectations.

Key Lessons Learned

- Early and structured involvement of all operators to collaboratively design, develop and deliver the strategy is key. It is vital through good governance and relationship management to create a symbiotic relationship, where there is joint and individual success for the organisations involved
- The production of customer assurance statements by all operators immediately prior to games time was invaluable to demonstrate what operators were delivering, as a framework for monitoring implementation through the Games and as an easy checklist to identify lessons learned and transition requirements for the Paralympics
- Ensure there is a large contingency of handbooks, pin badges and tabards, as operators who were not initially involved asked for large quantities of products at a late stage
- The handbook had overwhelmingly positive feedback, and does need to be in hard copy as it is an engagement opportunity with customers, and staff reported back they used it regularly with customers. Electronically held versions were less well used
- It was important to be determined, because early on products such as handbooks and pin badges could be seen as luxuries
- The handbook has had universal praise and has been used in government departments, LOCOG, British Transport Police and among GLA Ambassadors, with a much wider audience than transport staff alone
- It is worth investing in 'magic moments'. Customers loved them, and it was invaluable reputationally
- Review staff location regularly and move as necessary to respond to demand



Olympic Route Network and Paralympic Route Network

Background and Context

The ORN was a network of existing roads connecting competition and non-competition venues. It was designated by the Secretary of State for Transport through provisions in the 2006 Act which also gave powers to ODA to control and manage the network for the purpose of facilitating rapid and reliable Games Family travel to and from events or for other purposes connected with the Games. For the Paralympics the network was reduced in scale to the form the PRN.

For both the ORN and PRN, an additional alternative network was also designated, to be used when and if the main ORN or PRN became unavailable e.g. due to a road event or incident. Routes to key training venues were also included.

Roads designated formed routes that crossed multiple Highway Authority boundaries. The designation provided the ODA with the necessary powers to co-ordinate across boundaries and an ability to manage and re-engineer the network to achieve the challenging journey times that had been committed to in the Host City Contract. Moreover it permitted co-ordinated management and enforcement of the network to ensure that journey times were reliable and schedules for the efficient running of the Games could be met.

The majority of routes were part of the existing Transport for London Road Network and so the planning, design, delivery and operation of the ORN and PRN was led by TfL within London, in partnership with the local Borough and City Councils and the ODA in terms of engagement. The ODA delivered the ORN outside London working in partnership with the HA and local County Councils.

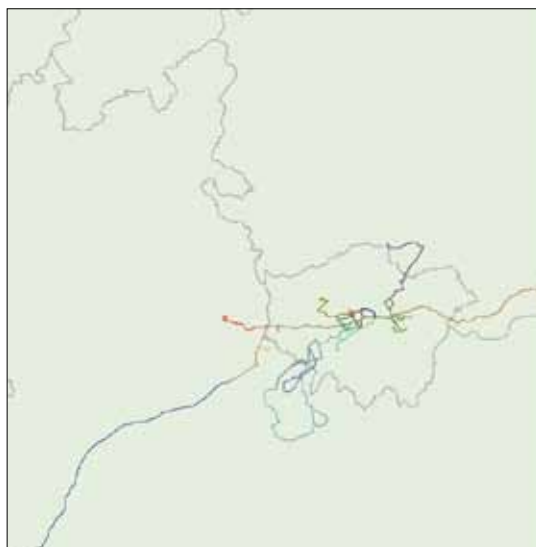
The roads designated as ORN and PRN remained open to general traffic, except for a few minor exceptions close to venues, however access onto the network from some side roads was restricted to protect reliability and journey times along the main routes. Journey times were also enhanced through an integrated combination of activity including;

- Traffic signal infrastructure improvements
- Extensive temporary road re-engineering e.g simplification of junctions, re-timing of traffic signals,
- Kerbside controls to keep the roadway clear
- Reduction in crossing points and interruption to traffic flow
- Ban on roadworks and enhanced response to incidents
- Strict enforcement of traffic regulation orders

- Swift vehicle removal for breakdowns and obstructions
- A system of priority Games Lanes, used flexibly and dynamically to aide Games Family movement
- An enhanced staffing and operation within the London Streets Traffic Control Centre with supporting traffic modelling, order making and traffic monitoring and analytics
- Games specific command, control and communication arrangements
- Messaging to drivers and other road users to avoid the ORN and PRN at certain times
- Retiming of freight and deliveries to night time operation
- Rerouting of service buses

Demand flow modelling was used to identify the location and timings of the busiest sections of the ORN and PRN. On these stretches of road and where more than one traffic lane was available, traffic lanes were dedicated for authorised Games vehicles. This network of Games Lanes proved to be a controversial feature of the ORN but was a necessity to ensure journey times were met. They were used sparingly and flexibly at Games time so as to establish the correct balance between the needs of the Games vehicles and general traffic. The ORN along with the Games Lanes within London were activated 2 days before the Opening Ceremony, for specific periods of time, generally 6am to midnight, and were decommissioned swiftly once competition venues closed. The only Games Lanes sections outside London – on the M4 eastbound coming in from Heathrow, and close to the Royal Holloway College Games accommodation in Egham – were brought into operation nine days earlier to facilitate arrivals and pre-Games training.

Olympic Route Network





The ORN/PRN was made up of four different categories of route:

- **Core:** Entirely within central and east London, main roads connecting the Games Family accommodation at Park Lane and Bloomsbury, the Olympic Park and the Greenwich and ExCel venues. In operation throughout the Games
- **Venue-specific:** Routes to other London venues, to venues outside London and the route to Heathrow Airport. In use for only part of the Games period whilst the venue is operating
- **Alternative:** Routes included as a contingency against disruption on one of the core or venue-specific routes and only used if needed, for example on days where road events are using part of the ORN/PRN
- **Training:** Routes so that athletes could get to and from their training venues

The PRN was entirely within London and about half of the length of the London ORN, 56 miles compared to 109 miles. The scale of the PRN was relative to the smaller number of competition and non-competition venues, but had identical service levels to the ORN. The PRN connected the IPC hotels in the City of London and the Olympic Park, Greenwich and ExCel venues.

Planning and Design Programme

The ORN planning and design programme consisted of a number of different but connected projects, to give the necessary operational control at Games time. These were:

- **Junctions and carriageway improvements to core and venue routes; Re-engineering of the road network and temporary introduction of traffic management measures.** Traffic modelling and micro-simulation of all junctions leading to beneficial changes to traffic signal timings; Restricted side road turns and/or road closures; Junction simplification to improve flow on main routes; Kerbside controls such as parking restrictions, changes to loading arrangements, relocation of bus stops and taxi ranks; Suspension of bus lanes, bus stops and pedestrian crossing facilities; Games Lanes Associated traffic sign and road marking changes
- **Network Instrumentation; Traffic signal technology upgrade.** Introduction of full CCTV coverage for the whole network to ensure immediate visibility of traffic conditions and incidents; Split Cycle Offset Optimisation Technique (SCOOT) adaptive software introduced across whole network, this constantly monitors traffic flows and adjusts signal timings at each junction to gain maximum efficiency of operation; Other supporting dynamic traffic management technology was also introduced

- **Clearway 2012.** Co-ordination and management of third-party projects affecting the designated ORN and the major roads in London; Removal of all planned utilities street works and highway roadworks on or near the ORN Enhanced response by maintenance crews for utility and other emergencies; ORN Compliance Ensuring the legislative and regulatory powers were in place to manage the network; On street enforcement of traffic controls Heavy and light vehicle removal service

In addition there were a number of major work streams undertaken by TfL and London Boroughs that supported the aims of the ORN programme and that were necessary for the effective operation of the ORN;

- TDM to influence driver behaviour and relieve pressure on the ORN - see separate close out report on TDM
- TCC to ensure effective co-ordination across transport operators and Games agencies -see separate close out report on the TCC
- Local engagement and communication. This was integral to the operation of the ORN ensuring that all traffic regulation orders were properly consulted upon and implemented with local awareness and understanding of their need. It also ensured local understanding of how and when the ORN would operate and the penalties for non-compliance. All frontages and premises within 400 metres of the ORN were consulted both informally and formally by letter, email, face to face and via drop in sessions and exhibitions
- Active Traffic Management. All traffic signals within London are controlled by TfL through its Traffic Directorate and control rooms. Area wide signal strategies were developed utilising in house knowledge, modelling techniques and the enhanced SCOOT and other systems to provide a fail safe protective shield around Games Family vehicle movements. This was used to great effect allowing flexible use of Games Lanes whilst also balancing the needs of other road users and businesses in
- Local Area Traffic Management and Parking Plans (LATMP). In close proximity to venues the ORN interfaced with the venue specific security, parking and access arrangements. Co-ordination was achieved via a Road Space Management Board that included representatives from TfL, London Boroughs, ODA and LOCOG. This work also covered Security (Vehicle Permit Checks/ Vehicle screening areas/ Hostile Vehicle Mitigation, last mile spectator routing, and look and feel
- Road events and Central London Zone. On certain days and at certain times parts

of the ORN and PRN were used for road races (marathon, cycle races, walking races, triathlon). Specific re-routing was planned and implemented during these times in conjunction with race organisers and affected venues. Similar arrangements were put in place as part of the Central London Zone, around the IOC hotels in Park Lane to accommodate egress from the Hyde Park live site, for the Torch Relay final leg and on Opening and Closing ceremony nights

Games Lanes Operation

Games Lanes were a requirement of the IOC and a commitment given as part of the Host City Contract. Games Lanes were allocated solely for accredited Games vehicles (those displaying the appropriate permit) and emergency vehicles on call.

Whilst the lanes were marked out and signed shortly in advance of the Games, they were only used for fixed and specific periods of time, where and when they were needed. The vast majority were located in offside lanes to achieve a free flowing lane away from left turning manoeuvres and kerbside activity.

The ability to enforce against unauthorised use of the Games Lanes was provided through the ORN Compliance work stream through on street officers and camera enforcement.

Special signs were authorised by the DfT to inform motorists of the hours of operation and location Games Lanes. Fixed signs were deployed together with 150 mobile variable message signs allowing complete flexibility over the hours of operation of the Games Lanes dependant upon the needs of Games traffic.

Variable Message Signs (VMS) signs were used extensively to "turn off" the Games Lanes and open them to general traffic. Games Family demand was moderate and the protocol that emerged was that VMS signs took primacy and Games Lanes were not in operation unless the



VMS signs indicated that they were. This proved to be invaluable in keeping general traffic moving and in winning the public relations difficulties that surrounded the perception of Games Family elitism. Games Lanes in London were only enforced through warning letters and public messaging.

Games lanes were switched off 60-70% of the time as the Games Family made extensive use of public transport.

Bus Lanes and Pedestrian Crossings

The ORN operation required suspension of some bus lanes, bus stops and pedestrian crossing facilities. Extensive consultation and refinement of design led to a significant reduction in the number of suspensions.

Most bus lanes and bus stops remained, however, where the road width was narrow and/or Games Lanes were introduced, then some were temporarily suspended to maintain access for all road users. Most suspended bus stops were relocated. Some lightly-used bus stops were monitored during the Games and only relocated if problems became apparent.

About 90 per cent of the pedestrian crossings

on the ORN and PRN were kept open, and their timings coordinated with adjacent traffic signals so that Games vehicles did not get held up with a series of red lights. At the small number of crossings that needed to close pedestrians were directed to safe alternative crossing facilities nearby. In all cases, a road safety audit was carried out by experts independent of the design team.

Legal Considerations

A robust legal framework for implementation and operation of the ORN was provided through the 2006 Act which provided for the Designation Order and the slightly modified application of existing Traffic Authority Order making and civil enforcement legislation to the designated roads. Defensible proposals required procedures to be followed accurately and consultation to be full and balanced.

A dedicated Orders team was recruited and a set of thorough procedures documented and followed. This included establishing an Independent Transport Panel to provide arms length oversight, and the breaking up of the ORN into carefully selected sections for Order making purposes. The Order making process proved to be sound, all objections and challenges to the proposals were overcome or dealt with and could be programmed efficiently.

A structured approach to developing preliminary designs and using a journey time calculator to assess the cost effectiveness of different measures, enabled a full set of ORN measures to be developed to programme.

Early planning work also paid dividends, from spending time on understanding the road network with the local authority partners, identifying hotspots and additional contingency routes which enabled more attention to be focussed on potential problem areas and possible fall back options, through agreeing Service Level Agreements and funding with local authorities well ahead of the Games so that all parties were clear about the roles and expectations and were able to prepare accordingly.

Other Issues

Work to establish good relationships not only between those with key responsibility for the ORN and PRN but also with wider stakeholders played a significant part in successful delivery.

Component testing, command post exercises and test events in the run up to the Games meant that by the time the Games did start, the operational teams had established excellent cross agency relationships and working arrangements.

Sharing of data and information generally worked well allowing quick response to potential issues.



Working across multiple organisations and geographic boundaries, compounded by the fact the ORN legislation was designed for London's roads, not motorways or the wider UK, did create some challenges. For instance:

- The ORN legislative framework was designed for London and other urban areas where the main means of delivering the journey time commitments was through temporary physical traffic management interventions, supported by local civil enforcement. Outside London and the venue towns the delivery strategy focussed more on 'keeping the traffic moving' through enhanced patrolling by HA Traffic Officers and the police, and needed to be supported by appropriate police enforcement in the absence of civil enforcement powers. This posed a number of challenges in engaging with and securing the appropriate co-operation and prioritisation by relevant parties
- Responsibility for developing the ORN/PRN and LATMP lay with different organisations, operating to different programmes and using different processes. This issue was resolved via the Road Space Management Board and meant giving a shared message to the public and stakeholders. This required strong leadership and cross-organisational working
- Delays were caused by transfers of responsibility from one organisation to another, such as to TfL for the ORN in London and to LOCOG for LATMPs
- Changing data. Games Family demand forecast on which all the planning for the ORN was based was always lagging behind the design programme. In the event, forecasts also proved to be well in excess of actual demand. This may well have been due to the great success of the TDM programme in changing Games Family travel behaviour i.e. the assumption that all provision for Games Family journeys must be by road was flawed for a City such as London with its fully integrated public transport system.
- Different organisations worked to different timelines and in particular the late availability of security designs for VSAs caused difficulties for the transport schedule
- The Clearway 2012 programme strengthened the relationship between TfL, London Boroughs and Utilities and delivered the required level of cooperation and pro-activity by the utility companies, to keep the ORN/PRN flowing

The performance target of 95% of journeys on time was exceeded. No-one missed their event.

Key Lessons Learned

- Transport forecasting and provision for Games Family should be appropriate to the transport regime in the Host City, some will use public transport, walk or cycle
- The unique nature of the ORN in London meant there was no real existing experience or expertise to call upon. Regular and open strategic review is needed especially with those who will run the Games time operations. Understand the project life cycle and employ relevant skills at each stage, it does not follow that the same teams lead throughout
- Flexible operation of Games Lanes is essential to help overcome political and public resistance
- It is important to ensure that the ORN and PRN are designed in a way that is relevant to each venue. The focus was on London venues but needed to be different for non-London venues
- Early engagement with key stakeholders and Delivery Partners is essential to understand their priorities and requirements. It is essential to understand the political, commercial and policy drivers of behaviour to be able to deliver a coordinated programme. An early understanding of the supply chain is essential
- Early engagement with utility companies and developers was essential to allow 2012 measures and requirements to be fitted into major utilities and development programmes
- Making the ORN/PRN proportional and flexible paid dividends as the competition schedule changed by day and vehicle flows changed hourly. The late installation of a myriad of VMS signs was a real boon
- The decision to focus on compliance rather than active enforcement was effective

No entry



Entry via
Warwick Road



Venue Transport Operations

A total of 34 competition venues were used to host the events during the Olympic Games of which, 24 were in London and ten outside. The two biggest clusters of venues were located at the Olympic Park, with eight venues, and ExCel, which held five individual arenas. In addition, three venues in Greenwich (North Greenwich Arena, Greenwich Park and The Royal Artillery Barracks), four venues in central London (Horse Guards Parade, The Mall, Hyde Park and Lord's Cricket Ground) and four venues in west London (Earls Court, Wimbledon, Wembley Stadium and Wembley Arena) were also provided. Outside of London, Buckinghamshire, Hertfordshire, Essex and Dorset hosted competition venues and five regional UK cities hosted a football venue at Coventry, Cardiff, Glasgow, Manchester and Newcastle. A total of 17 venues were used to host events during the Paralympic Games. Of these, 15 were in London and two were outside the capital.

Each competition venue was used for different time periods and on different days. The competition venues were selected by taking a range of criteria into account including the requirements and guidelines from each of the ISFs and the IOC, as well as London 2012's philosophy of making the best use of existing facilities and taking into account legacy needs.

In addition, the venues were positioned to allow the athletes to compete and train with minimal travel times from the Olympic and Paralympic Village. Those venues hosting Paralympic events underwent a transition phase upon the completion of the Olympic Games. Those venues not hosting Paralympic events were decommissioned at this time.

LOCOG was responsible for the planning of transport to serve all the client groups attending competition venues.

Venue Transport Operations was set up to ensure that all spectators and Games Family members could travel to and from each venue safely and efficiently whilst minimising the impact on local residents and business. The scope included; Games Family, spectator transport, parking and Vehicle Access Parking and Permitting Scheme to venues, ORN accessing venues, and LATMP around venues.

Venue Transport Operations was initially under the responsibility of the ODA, the scope, staff and budget were subsequently transferred to LOCOG with the ODA retaining an oversight role through a formal funding agreement. ODA continued to provide expert advice e.g. sustainable modes to support Venue Transport Management. In addition, a small operations integration team was retained to work with LOCOG Venue Transport Management, primarily at the Olympic Football venues. This team planned and co-ordinated accessible and bus shuttle services linking venue transport hubs with rail stations and car parks.



This approach was consistent with the overall "one team" approach to transport. The work was a collaborative effort involving LOCOG, local councils, emergency services and other key stakeholders. To facilitate the effective planning and co-ordination, Venue Transport Working Groups which included many stakeholders (Boroughs, operators, police as well as ODA, TfL and LOCOG) were set up for each venue comprising the key stakeholders for that venue. These working groups proved very useful throughout the planning processes for all the competition venues.

The working groups together with London 2012 produced Venue Transport Operations Plans (VTOP) which was the manual upon which a venue was operated. These documents considered venue capacity, ticket sales, local transport infrastructure and road and public transport service provision. They also considered accessibility, venue layout during the Games and other local conditions that might affect transport operations. A holistic view of public transport arrangements was ensured, by taking the macro-level demand and applying it to the event profile of particular venues. They were essentially for spectator transport and links to the ORN. The Venue-Specific Transport Operations Plans were the transport element of the Venue Operations Manual.

The first version of the VTOP was produced by the ODA in the autumn of 2008. The Venue-Specific Transport Operations Plans were then developed by LOCOG as part of the overall Games operational planning and focussed on the venue transport operations on the venues and the management of the client groups and their access to venue facilities.

A LATMP was a key element of the planning for each venue, and was critical to ensuring that the areas around each competition and non-competition venue worked effectively for Games Family traffic, spectators arriving by bus, taxi etc, and local residents and businesses. LOCOG worked closely with local authorities and other key stakeholders on the development and delivery of these plans, managing the complex interfaces with other projects such as venue operations and



the ORN. Planning and delivery recognised that LOCOG itself had no powers to manage the local road network and needed to work through local traffic authorities to agree the measures required and subsequent delivery and enforcement arrangements. Plans included:

- All transport operations inside the secure perimeter of venues and coordinated transport operations with Delivery Partners outside the secure perimeter of venues
- Extensive Local Area Traffic Management around all the competition and non-competition venues
- Extensive Parking restrictions across large parts of London where none previously existed (1.6million virtual permits and 250k paper parking permits issued)

Without these measures transport in and around venues would not have worked.

LOCOG also delivered the management of the Last Mile between the transport hubs and the venue perimeters, with the exception of the Central London Zone which was managed by TfL and Westminster City Council.

For some established venues, such as Wimbledon and Wembley Stadium, there was a good match of Games-time requirements to provision for events today. However, operations necessarily had some significant differences. Other venues, such

as the Olympic Park, Hadleigh Farm and Horse Guards Parade, were being used for sports events for the first time and consequently their transport profiles were determined and planned for.

For most venues, the spectator strategy was based around maximising high-capacity rail networks. Bus and coach services would supplement and complement these services. Walking, cycling and water-borne transport was also encouraged and provision made at many venues for taxi set-down and pick-up facilities. Games Family remained the responsibility of LOCOG and TfL (for the ORN in London). However, there was collaboration in the use of transport for spectators, staff and Games Family.

Private car parking for spectators was not provided at venues, but Blue Badge parking for disabled people was available at every venue to ensure accessible and inclusive access to the Games.

The Venue-Specific Transport Operations Plans were tested during the early part of 2012 as part of the LOCOG test events (commonly known as London Prepares series) and final amendments made for Games.

At Games time, a Transport Integration Centre was established at most venues or through an Event Control Room structure run by LOCOG. This was the central hub for the co-ordination of transport operations at each venue. Each had representatives of the transport operators, ODA



Operations Integration Team (where applicable), local councils and emergency services. The Transport Integration Centre provided updates to the Transport Command and Control centre which was LOCOG tactical level co-ordination mechanism and was co-located with the Main Operations Centre at Canary Wharf. The overall transport co-ordination was done by the TCC with the Transport Command and Control Centre having a direct relationship.

These arrangements were amended for the transition process to Paralympics. For example, Brands Hatch was the only venue commissioned for purely Paralympic operation. A London 2012 Paralympic Transport Transition programme ensured that all activities were successfully completed.



Key Lessons Learned

- The optimum allocation of transport scope between the OCOG and government agencies, such as the ODA, is difficult to achieve and needs careful consideration
- There were organisational challenges related to the planning of the Venue Transport programmes which initially reduced progress
- Paralympic planning was successful because a dedicated London 2012 team with assigned champions focused on the incremental issues associated with transition, well in advance of the start of the Olympics



Walking, Cycling and River Transport

Walking and Cycling

The London 2012 walking and cycling programme was rooted in commitments set out in the London 2012 bid to host the Olympic and Paralympic Games, to provide physical walk and cycle route enhancements and an 'Active Spectator Programme' (later renamed the Active Travel Programme to reflect a wider audience).

The programme delivered both physical route improvements and softer measures designed to promote travel behaviour change.

At the inception an Active Travel Advisory Group was formed, bringing together the core stakeholders and Delivery Partners. This group was advisory and though not part of the programme governance, did allow consultation and shared responsibility of scope.

TfL is continuing to consult with modal interests post-Games through the walking and cycling core consultation groups.

Delivery of Walk and Cycle Route Infrastructure Enhancements

One of the key principles used in planning for walking and cycling for London 2012 was to ensure that a legacy of local and strategic cycle and walking routes and associated infrastructure remained after the Games. Route improvements totalled 95km nationally, of which 75km was

delivered in London focusing on the Olympic Park and river zone venues. There was also investment in walk and cycle routes on the approach to venues outside London.

Additionally, a key element was to re-align and bring forward where possible other funded programmes, particularly TfL funded programmes, to ensure a coherent network of improved and upgraded routes.

Walk and cycle route enhancements were delivered both within and outside London. Within London the focus was on improvements to 8 walking and cycling routes. Some 120 schemes were delivered on these routes. These schemes were all delivered on time for use by spectators at the London 2012 Games and have met with widespread support and approval from walk and cycle user groups and stakeholders. They are particularly significant as a legacy benefit for providing improved accessibility to the Olympic Park, for a wide range of journey purposes. The true benefit of the investment in walk and cycle route infrastructure will therefore only be measured in the longer term.

The Active Travel programme included a suite of promotional and travel behaviour change initiatives. These included information and mapping, journey planning, cycle parking, venue operational and walk and cycle support services.

Spectators benefited from the excellent Legible London Wayfinding System with its easily understood "Heads Up" mapping.



During the Games, there was significant increase in pedestrian movement in Central London. In particular, the pedestrian counts in the West End during the second weekend (4th and 5th August) were 24% up on the previous weekend (27th to 29th July) and 14% higher than the weekend of 20th to 22nd July.

This trend was replicated across other sites in London. Outside the West End, there was a 15% increase on the previous weekend, and a 9% increase compared with 20th to 22nd July. This corroborates other evidence about the vibrancy of the West End.

In addition, Barclays Cycle Hire recorded its second busiest week in w/c 30 July with 275k hires. This followed the previous record breaking week of 23rd July when there were 294k hires.



Venue Operations and Walk/ Cycle Mode Share

A total of 14,600 London 2012 managed secure cycle parking places were provided and used to a maximum of 5,850 occupancy, depending on which venues were in operation. This was an overall occupancy of 40%. Usage of cycle parking was over 2,000 bikes on all 16 days of the Olympics, with 2800 users on 4th August (day 8 'Super Saturday') and 3,000 users on both days 6 and 15.

Take-up of cycling averaged about 0.5-1.0% of mode share across all venues. At some venues it was much higher. For instance, at the Hadleigh Farm Mountain biking venue, mode share for cycling was 4%. Not surprisingly the cycling competition events attracted the higher levels of cycling by spectators. Cycle parking usage varied considerably from venue to venue. To put this in context with other sporting events, most football matches see less than a 0.02% cycle mode share and other multi sports events in the UK, for instance the Manchester Commonwealth Games, 2002 it was around 0.2%. This also compares favourably with the 2006 Football World Cup where the average cycle mode share for spectators attending games was 0.8%.

Out of London venues (but not football host cities) had the highest cycle use, with a modal share of 4% at Eton Dorney, Lea Valley and similar at the other out of London venues. Cycle parking was always at or near full at these venues.

The Active Travel Programme Legacy Learning report will be published in December 2012.

The Barclays Cycle Hire Scheme helped encourage cycling, particularly in central London with its extensive network.



Key Lessons Learned

- Keep programme governance proportionate to the size of budget and as light a touch as possible
- Spell out the requirement for consistency at the beginning of the programme otherwise no funding will be forthcoming
- Start delivering wayfinding elements earlier on in overall programme
- Whilst recognising change is inevitable try and ensure objectives are not compromised
- Secure funding for specific bid commitments at an early stage and not retrospectively. The Active Travel programme is central to the realisation of sustainability benefits and consequently vital
- Consider focusing on turn up and go style walks and rides rather than pre-booked walks and rides
- Consider provision of smaller, more dispersed cycle parking facilities to serve venues rather than a few larger ones. This may be difficult due to land cost and availability and proximity of venue entrances



Waterborne Transport

Waterborne transport played a relatively small role in enabling spectators to access the relevant competition venues, however as it is an attractive travel option London was keen to maximise its usage within the overall available capacity of boats, piers and waterways.

The Games were presented as an opportunity to boost the profile of river passenger transport in London, particularly for travel to large events and secure investment in river infrastructure. To a great extent these aims were met.

New pier infrastructure was developed at Greenwich pier (a new pier roof to improve waiting conditions for pier users) and a new pontoon was created at Tower Pier to increase berthing capacity. These improvements had a benefit for Games-time river operations, although their main benefit comes as part of a longer term lasting legacy to develop river transport for passengers in London. This helped to meet one of the key objectives in the Mayor's River Concordat.

Demand forecasting work was undertaken to provide an understanding of the numbers of spectators likely to use Thames river services. The demand forecasting work indicated that there was spectator demand for river passenger services that

could be accommodated within the overall low levels of capacity available on the river, particularly at Maritime Greenwich and Greenwich Peninsula (for Greenwich Park and North Greenwich Arena). These river services played an important role in spectator transport plans, particularly on busy days at these venues.

The ODA also funded the provision of additional services in London on three key Thames River routes, augmenting travel options to river zone venues, particularly at the beginning and end of the day. The spectator use of these additional services was good, largely as they provided an alternative and pleasant travel experience :

- 2012 Games Riverbus Express operated by Thames Clippers (operating to Greenwich Park and North Greenwich Arena every day of the Olympics and Paralympics in the two hour periods before and after sessions at these venues)
- 2012 Games Rivertours services operated by City Cruises / Thames River Services. Operating every day to Greenwich Park
- 2012 Games Hampton Court Riverbus operated by Turks Launches. Operating on 1st August for the Road cycle time trial only.

River travel proved capable of providing a supporting role to events in the river zone of east London, into central London and to Hampton Court.

Thames Clippers riverbus services proved to be especially popular and the company reported good levels of ridership during the Olympic Games with high proportions of spectators pre-booking their travel tickets. Some 70% of capacity on their 2012 Games riverbus express services was pre-booked. Pre-booking of tickets was not as much in evidence for river bus services for the Paralympics, but 'turn up on the day' business was good, although not as good as for the Olympics.

River tours operators commented that they had fewer customers in July and August compared to the same period last year, partly because of the reduced numbers of tourists to London over the period of the Olympics which affected their business as a visitor attraction. Increased numbers of spectators using their services went some way to making up the shortfall. River tour operators ended up cutting the price of their tickets during the Games in an attempt to generate more business.

Waterborne transport, with its lower capacity and niche service on the Thames in London, was well utilised for scheduled services before and after competition sessions at Greenwich and North Greenwich and was regarded as a success.

Pier management, identified as key to the success of the river operation, was planned and well delivered, although at some piers not finalised until immediately before the Games. Ultimately

management of berthing and queues at piers was well delivered by the relevant pier owners, particularly London River Services. The late planning of pier management was indicative of interface issues with the key delivery parties, including both TfL London River Services and the river service operators. River operators were sometimes hesitant to co-operate openly with other operators, though these barriers were broken down and there is scope for improved relations in legacy.

On the busiest day at Greenwich Park (day 3 – Monday 30th July), river transport played a significant supporting role in helping to get 50,000 spectators to and away from Greenwich. The pier and surrounding areas were busy and there were some localised queue management issues, particularly at the ticket office on Greenwich Pier Promenade, which were quickly resolved for subsequent days.

Early indications suggest that river transport for spectators commanded a spectator mode share at both Greenwich Park and North Greenwich Arena of 4% for both the Olympics and Paralympics. Customer experience and perceptions as picked up through general observations of ODA and TfL staff during the Games were generally good.

There were no known significant problems relating to the command, control and communication of river passenger transport services during the Games with other river users. The high levels of pre-booking suggest that in addition to the attractive offer presented by river services, the travel information and online booking links from the London 2012 travel pages were effective.





A river service operated between Windsor town centre and Windsor racecourse pier throughout the Olympic Games, generally achieving 1200 - 1500 users per day in a single direction. This was an existing route and simple to access and use, and was considered a success helping to take some pressure off bus shuttle services. Like the river services in London the service offered a great experience in its own right as part of a day out at an Olympic event and this feature contributed to its success.

The Olympic Park canal passenger service, which ran between Tottenham Lock and the Olympic Park and Limehouse Basin and the Olympic Park, operating under the brand name Water Chariots, did not meet the forecast levels of spectator

patronage by the operator. The Water Chariots service was withdrawn before the end of the Paralympics due to low usage. This service was a speculative commercial enterprise that did not use any public funding. Another niche service, this had not run pre-Games and was probably too complex for users to engage with, other than for a sophisticated and managed corporate customer.

River service information for spectators was available through the London 2012 website including details on the nature of the services and their key features, venues served, timetables and key pier information. Accessibility information was also provided as river services generally provide a step free mode of transport.



Key Lessons Learned

- If relevant to the venue, river transport can play a small role in helping to transport large numbers of spectators to major events whilst offering a great experience
- Agree fundamental components of pier management plans for major events well in advance. Explore ways in which the river industry can work closer together and share common goals for its mutual benefit for large events
- Ensure all ticket desks at Greenwich pier booking office are utilised when there is a major event on. Ensure all queue lines are fully tested and staff dot plans are fully understood
- Ensure the less prominent modes, including waterborne transport are given the promotional opportunities and exposure to enable them to shine
- Ensure wayfinding and signage arrangements are fully agreed well in advance and that there are arrangements in place to contact a contractor to make changes if required
- Avoid anxiety and late rush to complete schemes through more robust project planning and sticking to the pre-agreed milestones
- Ensure pre-purchase of tickets for river services is an option for spectators. This increases operational and commercial efficiency
- Ensure contracts with operators are finalised well in advance and include sufficient criteria to enable effective performance management
- Ensure industry stakeholders, who can be robust and challenging in their views, are fully engaged around Olympic plans and have the opportunity to shape and influence plans
- Don't impose new systems of C3 on an established industry for a short term event



The Games transport operating strategy was predicated on providing enough operational, people and financial resilience to keep moving forward, whatever happened - business as planned but not necessarily business as usual. A "one transport team" approach existed to provide support when operational issues had an impact beyond the immediate organisation responsible for resolution. There was no situation where the operational responsibilities of an individual organisation would be compromised by the overall requirements of the London 2012 community either in planning or in actual Games time operation. Within the transport operational community the MD's and Chief Operating Officers of the transport bodies with a role in delivering transport for the Games organised themselves together as the STOG.

The coordination of Games Transport took place at three levels simultaneously, and while control and ultimate decision making remained within individual organisations, the levels were integrated and coordinated to ensure a joined up approach:

- STOG
- Network Coordination (TCC); intelligence (provided by Transport Analytics), operations (NOC, ISTCC, Main Operations Centre.)
- Local Management- Venue Transport Operations Plans, local co-ordination around the Olympic Park by OPTIC, operations interfaces with Directly Managed Transport, Access and Inclusion, and cycling and walking

Other operational groups focused on particular issues were also part of the overall approach.

Senior Transport Officers' Group

The STOG - a working group of senior officers from across the transport environment - was formed to provide the transport community with a forum for the senior operational managers to provide inter-modal transport awareness and problem solving at a senior level for the period up to and including the Games. Terms of reference were agreed by the STOG and a series of meetings and exercises held to prepare the transport domain and STOGs for the Games.

Together they provided informed strategic direction and guidance, undertook consensus building and acted as the escalation point for the TCC for the resolution inter-modal transport issues beyond the responsibility of any one agency.

Single transport mode decisions remained with their agencies and the existing transport command, control and communication structures remained unaltered as agreed.

The 'Duty STOG' was the initial point of contact for the Head of TCC and also hosted daily teleconferences of the entire group. Escalation issues included:

- Multi-modal issues where ownership crossed several modes and a detailed level of co-ordination was required
- An incident judged to have an impact on Games operations
- An incident with the potential for reputational or financial implications

Duty STOGs started on the day the Torch landed and finished three days after the Paralympics closed.

The relationships forged by the STOG will endure past the Games and support the efficient planning and delivery of transport at future major events.

Transport Coordination Centre

The TCC continued the unprecedented level of integrated transport coordination and communication through a single coordination centre in preparation for and during the 2012 Games.

A bespoke operations facility it co-located coordinators from the major transport modes in a single operations room, equipped with the individual communication and information systems of the parent control rooms. Its role was to provide a central point for monitoring and coordinating all transport operations (excluding air and sea) for the entire Games period.

It provided a single platform for active sharing of information and coordinating responses to incidents between representatives from multi-modal transport providers, existing transport control centres, Government, media-operators and other stakeholders. This both supported Games spectator movements and helped to keep London and the UK moving. Its job was to:

- Provide a central point for monitoring and coordinating all domestic transport operations affecting the Games across the UK
- Provide coordination with transport organisations' control rooms through appropriate representatives based in the TCC
- Monitor transport security issues/incidents and exchange information with the National Olympic Coordination Centre (NOCC), utilising British Transport Police representative/s embedded in the TCC

- Report on transport issues and exchange information with the Main Operations Centre, including adapting to sport competition schedule changes
- Respond to requirements from the Main Operations Centre with rapidly developed plans that are in turn executed swiftly
- Provide transport organisations with information on the real time running of the Games so that agencies can prioritise their service-delivery to meet travel demand and deliver outstanding real time information through the TDM desk
- Define and agree contingency plans for incidents and the subsequent coordination of these between transport modes
- Monitor incidents that are under management by transport control rooms and provide updates and status reports (on information received from the transport organisations' TCC coordinators) to Main Operations Centre and other transport agencies
- Maintain an audit trail of actions taken

The TCC worked largely to plan; a result of intensive testing and exercising to eliminate risks and to pre-prepare for likely eventualities.

The scope of the TCC did however change and it became a far wider organisation reporting on transport issues within a wider remit to a wider audience. A series of additional C3 hubs were also created just before the Games and came into operations untested and unintegrated. This required last moment amendment of plans and processes and a new look at connectivity in a number of areas, to ensure the TCC, plus the additional hubs, worked as intended.

The ODA Transport Hub

The hub was put in place to:

- Manage ODA contracts with transport operators
- Drive transition to Paralympics
- Integrate accessibility provision across the UK
- Be the single source of truth for modelling, data, analysis and facts
- Ensure northern European spectators were catered for effectively and integrate surface arrivals and departures eg Eurostar, Eurotunnel, Ports
- Champion an enhanced customer experience
- Provide subject matter experts on sustainability; walking, cycling and river transport
- Manage boundary issues such as interfaces with other major projects; city operations, arrivals and departures etc

These activities enhanced the services provided by operators and delivered assurance to ministers that the statutory Transport Plan was being delivered; certainty to the ODA that its money was being spent wisely; and intelligence to the STOG to enable good operational decision making, feeding it with trending and forward looking analysis to complement the real time data feeds from the TCC.

The Hub also provided information on transport from a global perspective, based on 7 years planning and integration that was vital to the 'big picture' and was not available elsewhere.



TfL Games Leadership and Games Senior Officers Conference Calls

Throughout the Games period, TfL established a twice-daily conference call with key duty transport operations officers and STOG members to ensure performance on the public transport and the road network was clear and understood amongst key partners.

The time of the call was integrated within the 'Games Daily Rhythm' to ensure appropriate information was available for swift and informed decision making. The call proved an effective forum for members to share and collaboratively resolve current, and emerging issues with the major transport Delivery Partners, and ensured joined up communications with the Mayor of London and government.

In addition, a conference call between the Commissioner of TfL, LOCOG Director of Operations, MET Assistant Commissioner and Mayor's Olympic Advisor was set up for senior officers to address multi-domain issues in case required. Due to the successful performance delivered during Games Time and robust collaboration network, there was no need to use this contingency conference call during the Games.

Olympic Park Transport Integration Centre

A transport integration centre to cover the area of the Olympic Park known as OPTIC was located at Stratford Station, tasked with enhancing the communication between the various transport providers in the area and, through its Crowd Management Centre, playing a key role in managing the crowd flows between the Park and railheads.

With rail services at Stratford, Stratford International and West Ham stations working close to capacity for much of the Games and handling up to 80 per cent of the anticipated visitor numbers, OPTIC was also responsible for monitoring, directing and redirecting the crowd flows as appropriate into the various stations to make the most effective use of available train capacity. A direct result was to minimise queuing times and enhance the customer experience.

Co-location with the Venue Transport Operations Manager's organisation ensured that resources were concentrated to provide a service to support the transport providers with their responses to various contingencies.

Directly Managed Transport Operations Centre

The Transport Directly Managed Transport Operations Centre operated throughout the Games and oversaw the direct delivery of 1.4m spectators in London and another 1.6m to venues outside London. Although the great majority of decisions were made on the ground at each venue or operational location, the Transport Directly Managed Transport Operations Centre was needed to ensure all systems and services had consistent, relevant, accurate and up-to-date information; SS&E compliance, financial oversight; effective response to operational challenges; and to provide an efficient and easily accessible operational interface for all transport Delivery Partners. This included:

- Specialist advice on DMT contracts and services
- Support related to Control and Communications
- Rapid response to escalated ODA risks and issues
- Deployment of the Mobile Response Team as required
- Monitoring high-risk areas and determining trends to prevent issues spreading
- Validating accuracy of information received
- Monitoring overall performance of specialist fields
- Ensuring correct lines of communication are maintained
- Appropriate use of contingency
- Providing public communications interface

The Transport Directly Managed Transport Operations Centre was also an interface with the other organizations involved in delivering transport for the Games including the ODA, DMT, TCC, TDM, LOCOG Transport, LATMP as well as Local Authority, HA and key stakeholders as required.

Mobile Response Team, Operations Support

A Mobile Response Team responded to operational challenges on the ground that required additional resources, as and when necessary - for instance the Opening and Closing Ceremonies. The team was managed by the Transport Directly Managed Transport Operations Centre and further support was sourced from Delivery Partners as required.

Transport Integration Centres

Transport Integration Centres (TICs) also operated for the main venues other than the Olympic Park - Eton Dorney, Hadleigh Farm, Lea Valley, Weymouth & Portland and the five regional Football stadia.

The TICs provided an overview of operations, a conduit of information both to and from the various venues and a forum and location to facilitate integrated decision-making for 'on the ground' operational teams, ensuring rapid response to risks and issues. They were also responsible for ensuring coordination and integration of a range of operational areas including bus and coach operations, park and ride/walk, accessible shuttles, Passenger Transport Executive delivered shuttles and park and ride, local authorities, local police and emergency services, highways agencies, traffic control, local public transport, the ORN, travel demand management, local area transport management and planning, 'last mile' and British Transport Police.

Each Transport Integration Centre structure varied to suit the existing infrastructure and operational delivery methods. Those developed purely for the Games were led by the Spectator Transport Manager but where the Transport Integration Centre was within an existing command centre, it was led by the current organization's owner. Some Transport Integration Centres were 'virtual', if complexity of location and short duration of competition warranted. Regardless of location the basic decision making structure remained the same, with all key players working together to ensure an integrated and seamless spectator transport operation.

The Delivery Partners

The specific responsibilities of the organisations involved in delivering Games transport were:

- **TfL:** TfL is the integrated body responsible for London's transport system. It manages London's buses, trams, London Underground services, the DLR, London Overground suburban train services, river services, London's taxis, Cycle Hire and promotes walking and cycling initiatives. TfL is also responsible for London's major highways, all of its traffic signals, the Congestion Charge and the Low Emission Zone. As well as keeping London moving during the Games, TfL was responsible for developing and managing the ORN and PRN, travel demand management, design and procurement of Games specific wayfinding and signage coordination of its subsidiaries to ensure that an integrated rail and surface transport service is provided for the Games. In addition, the Mayor's Transport Strategy required TfL to produce a Transport Legacy Action Plan to ensure the long-term benefits of

investment in Games transport. After 2011 TfL took over responsibility for TDM and freight. TfL also worked with LOCOG on the planning and the delivery of the Central London Zone and Road events

- **NR:** NR is responsible for most of the UK's rail infrastructure and, together with train operating companies, had shared responsibility for delivering train services to the travelling public:
 - Delivering agreed transport enhancements as part of the Transport Plan
 - Facilitating the delivery of the National Rail timetable for the Games
 - Planning and managing work on the railway to minimise disruption on key routes during the Games
 - Managing the London major stations, working with train operating companies and TfL
 - Contributing to the operation of the Olympic Park Transport Integration Centre and the TCC
- **TOCs and ATOC:** ATOC is responsible for planning and operating passenger rail services, managing stations, providing passenger information, providing assistance to disabled passengers, and fares and ticketing
- **HA:** The HA was responsible for working with the ODA to provide the ORN outside London, providing traffic information and Traffic Officer services and keeping the major road network moving across the UK
- **DfT:** The DfT supported delivery of transport for the Games through funding and delivering specific projects and work streams. In particular, it led for Government on delivery of the arrivals and departures workstream. In addition, DfT appointed a SRO who reported directly to the Secretary of State for Transport and was responsible for ensuring that the plan was delivered according to the established objectives
- **GLA City Operations:** The City Operations programme was designed to address the 2012 Games-related work required in London, but outside official venues. Much of this programme had transport impacts, either by generating demand or by supporting transport solutions.



The City Operations programme was divided into two main groups; the London Experience, designed to show London in the best possible light, and Public Services, which aimed to keep services operational. All of the underlying work streams interfaced and impacted on Games transport (and vice versa) to varying extents

- **The London Boroughs:** In addition to maintaining services, keeping the city moving and protecting customers, the London Boroughs had a wide range of tasks during the Games including:
 - Facilitating the Olympic and Paralympic torch relays
 - Managing planning and licensing for Games venues including ensuring public safety and statutory compliance
 - Planning for the ten road events that passed through Central London and their real-time management
 - Parallel events
 - ORN/PRN enforcement
 - Clearway 2012 and other traffic management measures
 - Safeguarding and improvements to the public realm
- **City operations outside London:** City operations outside London were led by the relevant local authority, engaging Delivery Partners and the ODA as required. A similar approach to that developed in London was adopted

Integration with Other Functional Operations Teams

Other functional operations teams that worked closely with the various transport teams included:

- **National Olympic Coordination Centre:** The safety and security operation comprised a series of locally commanded but nationally coordinated operations which worked alongside existing national coordination structures and managed the implications for the Games. An Olympic Intelligence Centre supported the Olympic safety and security operation, by handling and filtering all Olympics related intelligence. The National Olympic Coordination Centre (NOCC), under the leadership of the National Olympics

Security Coordinator provided a fully integrated Olympic security coordination capability, that enabled the multi-agency coordination of safety and security operations throughout the UK during the Games. It facilitated timely flows of information between security partners and Olympic/Paralympic delivery organisations, and between operational level commanders and the national security coordination partners comprising central Government and national counter terrorism structures

- **London Operations Centre:** City Operations were coordinated from a London Operations Centre. It maintained situational awareness of various aspects of city operations including issues related to delivery of public services, non London 2012 branded scheduled events, and Team London Ambassadors. A core component of the overall City Operations Command, Coordination and Communication (C3) landscape, it was a fully functioning operations interface for London Local Authorities and the GLA with the other Games time C3 structures. It was jointly made up of the London Fire Brigade, London Borough and GLA staff
- **Olympic Committee:** Government coordination was based on the tried and tested Cabinet Office Briefing Room model, for the coordination of major events and periods of heightened reputational and operational risk to Government. The committee had the authority to take decisions across the full range of Government activities in support of the Games. It was also the natural escalation point for incidents and crises emerging in any other sphere of Games activity that had the potential to disrupt the Games or bring about reputational damage for the UK more generally. The GTB worked closely with the committee and the supporting Olympic Secretariat.

- **Central Zone Licensing, Operational + Safety Planning Group (CZ LOSPG):** This was chaired by WCC on behalf of the eight borough areas it covered and all those who agencies or service providers who worked or planned across the Central Area.

CZ LOSPG's role was to :

- Co-ordinate plans presented by agencies, organisations, LOCOG and others presenting themselves as organisers;
- Ensure a consistent approach from agencies when assessing the likely practical, viable and safe operation of proposals both in support of organisers and those of organisers; and,

- To assure communications between agencies and organisations.

This was done through one main group (CZLOSPG) which had the following sub groups reporting in :

- Transport (TfL chair);
- Health Response (NHS/London Ambulance chair);
- Media Operations (London + Partners chair): and,
- Crowd + Visitor Management (WCC chair).

CZLOSPG received reports from all the appropriate transport and individual services throughout its 30 monthly operational period meetings.

Transport was key to the organiser's plans. ODA and TfL worked closely together to provide CZLOSPG with all levels of assurance from the worst to the best outcomes. The degree of inter agency working on Transport in particular shone bright throughout the Games and achieved the task set of not being the story until as part of a successful one post Games to ensure it met its aim of 'safe and successful'.

Key Lessons Learned

- Whatever C3 structure is put in place and however well it works, people will still default to using personal contacts to short circuit it, at the first sign of delay. The C3 system must be designed to manage this propensity
- During the Games, both LOCOG and TfL measured the performance of the ORN. Since they adopted different methodologies (and therefore measured different things) they produced different results. This point was sometimes missed by the non-specialists who had access to the reports. The lesson is that data availability and presentation to non-specialist decision makers must be carefully managed
- Appoint a Programme Board and dedicated staff across organisations to manage Paralympic activities well in advance of the start of the Games, to ensure a successful transition



**Access
and Inclusion**

Everyone involved in London 2012 was committed to an inclusive approach in helping everyone with their travel to the Games. Accessibility was integrated throughout all levels of transport planning, demand forecasting, infrastructure improvements and venue transport operations.

A huge amount of planning went into making the London 2012 the most accessible Games ever, so people could travel safely and with confidence. The accessible transport strategy and accessible transport plan were shared with numerous transport experts and disability user groups to ensure they were fit for purpose.

Operational plans were finalised in conjunction with the transport Delivery Partners and accessibility improvements were hardwired into the £6.5billion spent on the transport network ahead of the Games. The Accessible Transport team remained in place to oversee and monitor the delivery of the programme throughout both the Olympic and Paralympic Games.

As a result a significantly more accessible transport network will be left as a legacy into the future.

Forecasting Demand for Accessible Transport

Extensive modelling work and assessed rail rolling stock capacity for disabled spectators confirmed capacity in the current rail plan model. Total demand assumptions were obtained for disabled spectators and crowd analysis was undertaken

based on capacity, passenger scenarios and sensitivity testing. Demand forecasting work continued right up to the Games to assist venues in understanding the requirements for disabled spectators. Ticketing information also provided information on the expected numbers of disabled spectators and their likely mode of transport.

Assessing Transport Network Accessibility

A feasibility study for accessible shuttle services was carried out. The demand for accessible parking was identified and sites secured at all venues. Venue accessibility audits, desktop studies and hazard and operations studies were undertaken to ensure the requirements of all spectators were fully recognised and integrated wherever possible. In addition, accessible station to station shuttles were provided where they were needed and onward step free options were limited.

Accessibility Investment in Public Transport Infrastructure

The ODA worked with TOCs to identify accessibility gaps in rail provision and also smaller projects that would make a really positive difference, contributing funding to projects such as the refurbishment or installation of accessible toilets, seating and accessible ramps, as well as larger projects to improve accessibility and bring forward step free schemes at key stations.



In addition, the ODA along with TOCs, NR and the DfT invested in an enhanced assistance booking service for passengers called Passenger Assist. The new system was developed and implemented by ATOC prior to the Games and helped delivery of booked assistance to over 13,000 disabled rail passengers during the Games.

For instance funding was provided to London Underground for the platform train interface project. This provided additional platform humps on the Piccadilly Line and introduced the use of manual boarding ramps at 16 stations. Another project was making pier and river vessel access improvements to TfL River Services.

Investment in Accessible Public Transport Capacity

The 3 car upgrade on DLR, DLR line extensions, Stratford Regional and International station upgrades and the London Overground extension have also all helped to greatly increase the capacity for wheelchair users on the network particularly during peak hours. Additional funding also improved and refurbished key lifts on the DLR network to help improve reliability and availability for disabled spectators.

Blue Badge Parking at Competition Venues

Every venue had blue badge parking located at or close to the venue. At venues where remote blue badge parking was the only option accessible shuttle services were provided. Spectators were also able to pre-book parking when their ticket allocations were confirmed. The amount of spaces at each venue varied in relation to the size of the venue and the public transport options available. Over 1800 pre-booked spaces were provided on the busiest days.

Accessible Transport Hubs

Strategic Park-and-Ride sites had accessible parking spaces and the associated shuttle buses were suitable for disabled spectators. At some venues where space around the venue was restricted, remote blue badge parking was provided with accessible shuttles providing a regular service (e.g. Lords Cricket Ground, Weymouth and Portland and ExCel).

Set Down and Pick-Up Facilities

Pick up and set down facilities for the accessible shuttle buses were secured across all venues, along with pick up and drop off points for taxi and private hire vehicles.

Accessible Bus Shuttle Services

Accessible shuttle services were provided at all appropriate venues and stations. Additional station to station shuttles were provided where onward accessible travel options by public transport were limited. The uptake of these routes was less than the other accessible shuttle services but proved a vital link for disabled spectators to join up their journey. Up to 5000 spectators a day used the accessible shuttle bus service on the busiest days.

Test Events

The accessible transport programme and processes were integrated into all the major test events, desk top exercises and readiness tests, working with transport Delivery Partners on specific accessibility testing and major spectator events in London. Trials of the accessible shuttle bus routes and services including monitoring the service and performance at blue badge parking sites. There were public transport tests at key stations during the Jubilee and other major events.



Lift



to upper level and



Queue
here for
lift



Accessibility Training

Transport Delivery Partners service and accessibility training was assessed against the DfT guidelines and accessibility was integrated into individual transport service providers plans. Accessibility was incorporated into training resources and content was included in Games 'guides' for the transport industry such as the Taxi and Private Hire Handbook, En Route (the transport providers handbook) and the GLA Welcome to London training.

Maintenance

Transport Delivery Partners produced specific plans with lift engineers on site at key stations, and many lifts were given enhanced maintenance before to the Games to ensure greater reliability and resilience. London Underground agreed the use of fire service lifts in key locations where demand was predicted to be high. In the event this service was not required during the Olympic Games.

Increased Resources

The ODA worked with Delivery Partners to ensure they had the right resources and offered the right services during the Games. The ODA also contributed funds to the improvement of the Passenger Assist system which enables disabled passengers to book assistance on national rail services. 120 service co-ordinators were recruited to work on the accessible shuttle services.

Plans and Maps

Significant contributions allowed the production or revision of all spectator facing maps and information guides. This included maps for the London 2012 website, blue badge parking information packs, venue maps, accessible rail network plans, sport guides, the Transport Handbook and the Olympic Transport Plan.

Journey Planning Material and Information

The London 2012 Accessible Transport Strategy (2008) provided the overall aspiration to coordinate and facilitate accessible transport options for spectators and Games Family getting to and from venues. Detailed accessible travel information and maps were published on the London 2012 website to align with the Games ticket launch. A year before the Games the first stage of the accessible spectator journey planner – Rail – was launched on the London 2012 website. Further accessible transport modes were added in the succeeding months including buses, DLR, river, tram and road planning to accessible parking sites and park-and-ride sites.

Two hundred station (Rail / DLR/ Coach) accessibility audits or re-audits were also undertaken for inclusion on the SJP to ensure information was up-to-date and accurate. In addition accessible transport guidance was integrated into the sport guides that each spectator received by post with their tickets.

Accessible transport chapters were also integrated into the Transport Operators Handbook and the Taxi and Private Hire Handbook.

Stakeholder Engagement

Throughout the development and delivery of the Accessible Transport Strategy and Plan the ODA worked with a wide range of external stakeholder groups. In particular disabled people locally and nationally through forums, conferences, user group meetings and advice desks at key events attracting disabled people played a key role in the development of the strategy. They were also involved in the trials of products and processes to improve the accessible transport network and in test events.

A wide range of disability groups and organisations with specific needs were involved such as: Disabled Persons Transport Advisory Committee; Independent Disability Access Group in London; Whizz Kids; LOCOG's Disability Stakeholder Groups; TfL 2012 Stakeholder Group; Transport for All; London 2012 Equality and Diversity Forum ; Passenger Focus and the International Paralympic Committee Transport Group.



Key Lessons Learned

- The Games have been a substantial catalyst for change within London in respect to Access and Inclusion
- The setting up of a high level Accessible Transport Board ensured that there were no cross party interface issues
- The use of accessible shuttles worked exceedingly well and helped tremendously to provide a seamless journey for disabled spectators
- It is important to ensure that the relationships and handover between different parts of a holistic transport system are fully integrated and joined up
- Normal travel patterns for all parties can be heavily influenced by the provision of relevant and accurate journey planning material
- The capacity for over height vehicles in Blue Badge parking was higher than forecast
- The response to the use of manual boarding ramps on the Underground was positive from both staff and spectators



Sustainability

Delivering sustainable and accessible transport to everyone in London during the Games was a priority issue.

In keeping with the low carbon Games commitment, the ODA planned for 100% spectators and workforce to travel to London venues by the most sustainable modes, namely public transport, walking or cycling.

London 2012 developed its approach to transport sustainability by focusing on key themes where transport posed a significant impact. This allowed allocation of funds and resources in the most effective and efficient manner. These themes were:

- Climate Change (CO₂ and other greenhouse gas emissions)
- Accessibility and inclusion
- Healthy living

In addition to these headline themes, the ODA had several mechanisms for identifying sustainability issues.

As part of development of the Transport Plan, an independent Strategic Environmental Assessment (SEA) ensured that environmental impacts were taken into consideration at the earliest opportunity. In particular, it covered areas such as climate change, air quality and noise related to the Transport Plan. This assessment did not identify any significant adverse effects that would be likely to arise from the operation of the measures contained within the Transport Plan. This is primarily because the Plan's proposed measures were based on maximising the use of existing infrastructure and services, therefore minimising the environmental impact. In addition, the length of time that the Transport Plan was to be operational meant that all effects would be temporary in nature.

Sustainability assessment work continued in accordance with detailed development of the London 2012 Surface Projects, including further SEA, Health Impact Assessment (HIA) and focused technical assessments including ecology, biodiversity and air quality surveys. Overall the SEA concluded that, temporarily, the Games should have a minor beneficial effect on air quality, but acknowledged that there could be some small adverse effects in specific locations.

A transport sustainability forum was established to share information and knowledge about developments with Delivery Partners and key stakeholders including; TfL, NHS, LOCOG, Commission for Sustainable London and the environmental regulators.



A Sustainable Approach

To achieve a public transport Games the focus of the Olympic Park planning and design process was on providing and promoting access via low carbon and sustainable transport. The need to travel was also minimised through locating the Olympic Park near a major transport hub and the positioning of other venues in clusters.

A programme of infrastructure improvements was identified with London Underground, NR, DfT and ATOC in order to improve the accessibility of the rail network. The provision of accessible shuttle bus services was also planned to provide a whole journey accessible solution. Accessible transport was also a key consideration in the development of the SJP.

The ODA also sought to minimise the carbon emissions through low carbon build of transport infrastructure and through low transport operations and also to change behaviours to more sustainable travel in legacy. Ticket holders were also issued with a Games Travelcard to use on public transport within London zones 1-9, and discounted fares were negotiated with train operating companies and national coach services.

In accordance with the Healthy Living theme, the Olympic Walking and Cycling Route Enhancements delivered by TfL set out to deliver 80km within London, a further 20km of walking and cycling routes were planned outside of London.

The Legible London Pedestrian Wayfinding System proved very popular and other cities as New York are considering introducing similar system.

Significant Investment

Significant investment was made to improve the public transport infrastructure in and around London, which is already delivering an early legacy benefit.

Walking and cycling routes leading to Games venues both inside and outside the capital were upgraded. The most significant improvements were made around the Olympic Park and River Zone areas, where over 95km nationally, 70+km in London of walking and cycling routes have been upgraded. In total, 113 schemes were completed across eight key routes, including resurfacing, improving access, adding dropped kerbs, widening paths and improving road crossings. TfL led on the delivery alongside local authorities and other organisations such as British Waterways and Lea Valley Regional Park Authority. These routes are known as the 2012 Games Walking and Cycling Routes and include 37 Legible London monoliths as signage for pedestrians and cyclists.

As well as providing a better environment for spectators travelling to Games venues, these routes were built with legacy in mind, connecting with existing networks so people can continue to enjoy using them long after the Games are over.

Outside London, enhanced crowd safety measures and improved access was provided at the City of Coventry Stadium venue and Weymouth rail station. The Games was also the catalyst for the completion of the Weymouth Relief Road and the Weymouth Transport Package, both delivering significant long term enhancements to the local road network in West Dorset.

In total, access improvement works at over 90 national rail stations were completed by Games time.

Some of these were completed by the ODA in partnership with train operating companies and the DfT's 'Access for All' programme, including access ramps, platform seating, lifts and accessible toilets. By July 2012, 65 London Underground stations were step-free from street to platform, and a further five will provide step-free interchange.

The walking and cycling routes were completed and officially launched on time, cycle parking was provided at all venues and maps showing the walking and cycling routes to, from and around each Games venue were developed and published on the spectator travel website.

Minimising Carbon Emissions

Carbon footprinting was a key way for London 2012 to measure its environmental impacts and studies commissioned into the carbon impact of spectator transport calculated a 61% reduction in carbon emissions when compared to standard UK events.

For instance the transport strategy for Weymouth and Portland reduced congestion, consequently improving air quality and minimising carbon emissions:





- The limited public transport infrastructure in Weymouth and Portland, the venue for the Olympic and Paralympic Sailing competitions, along with the high number of non-ticketed spectators these events were likely to attract combined with a road network that already suffered summer congestion, presented particular challenges for transport planning
- Most people access Weymouth and Portland by car. If this had been allowed to happen at Games time, the increase in carbon footprint would have been significant: almost 30,000 tonnes of additional emissions from vehicles, along with congestion and impacts on air quality
- To tackle this, London 2012 encouraged widespread use of national rail services, scheduled and chartered coaches, and walking and cycling for local and overnight visitors. Park-and-ride, park-and-cycle and park-and-walk services were provided for car users. The reduction in carbon delivered through these measures was more than three-quarters, down to 7,000 tonnes of carbon dioxide, a 77 per cent reduction in spectator journey-related carbon emissions

Carbon in Construction

A carbon footprint assessment of the West Ham London Underground and Greenway projects showed a total reduction in carbon emissions of 359tCO₂e, amounting to 44% of the Reference Footprint, was achieved through the implementation of three key reduction measures, which produced data that was sufficiently robust to report on:

- Using grid electricity on site instead of a diesel generator. By switching the site electricity source from a diesel generator to grid electricity, a carbon saving of 7.6tCO₂e was made. This equated to a 29% reduction in emissions from onsite energy and a 1% reduction in the total baseline carbon emissions
- Replacing standard concrete with the low carbon 'London 2012 mix.' By adopting this low carbon concrete specification, as developed for the Olympic Park and Village, it was possible to save 83.5tCO₂e. This equated to 11% of the baseline construction materials' carbon footprint and 10% of the total baseline carbon footprint
- Making the London Underground platform modular so it could be dismantled and used elsewhere. This delivers the greatest potential savings. Assuming the platform has a lifespan of 10 years and it is used for the Olympics for a two year period with a secure post-Games legacy, this will create savings of 264tCO₂e.



This equates to 34% of the baseline construction materials carbon footprint and 33% of the total baseline carbon footprint.

In order to minimise the carbon impact of visitor travel further still, the ODA worked with BP Target Neutral who offered all spectators the opportunity to offset their emissions. These high quality carbon offsets are compliant with the International Carbon Reduction and Offset Alliance Code of Best Practice and meet the standards set out in UK's recently published standard on carbon neutrality.

A range of dynamic measures were also introduced to minimise the carbon impact of transport still further, for instance:

- To avoid empty buses, buses were run to meet demand where possible rather than sticking rigidly to a timetabled service
- Park and ride sites were managed in a resource efficient manner in accordance with demand (i.e. use of most appropriate sites and avoidance of unnecessary use of land and associated resource, i.e. lighting)

In relation to air quality, the SEA concluded there should be minor temporary beneficial effects generally, but with minor temporary adverse effects in some specific locations from the operation of the ORN and PRN. As such, The ODA and TfL contributed funding for the locations that were projected to see increases in PM10 concentrations during Games time to be mitigated with targeted Cleaning and Application of Dust Suppressants to try to help minimise impacts. The areas identified were A13/A12 corridors; Strand/Victoria Embankment/Waterloo area; Olympic Park environs; and an area to the north-west of the central zone. The ODA also contributed funding towards the retrofitting of buses with Selective Catalytic Reduction technology on routes which passed through or intersected with NO2 exceedence areas that potentially experienced increased concentrations as a result of the ORN. Measurements have shown that air quality was not exacerbated by Games transport.



Key Lessons Learned

- Ongoing communication with regulators and statutory bodies ensured ongoing compliance and allowed early warnings throughout operations
- Promotion of sustainable travel changed behaviour
- Feedback received demonstrates that cycle parking was underutilised in some locations
- Successful incident reporting and monitoring and measuring systems helped to ensure successful delivery of the sustainability strategy



Safety

Spectator transport was recognised early on as one of the key risks to delivering a successful and safe Games.

In the UK, transport is delivered by a wide range of organisations and through many different modes, such as rail, metro, bus and coach and river services, in addition to sustainable modes such as cycling and walking. Accommodating the forecast 12 million ticket holders across the UK was going to be a challenge in its own right. To do it safely with such a wide remit presented its own challenges.

The overall transport challenge was simple - to identify the transport demand during the Games, understand the existing capacity and supplement those areas where demand outstripped capacity. However, with 34 venues across the UK, safety planning was essential.

Following the requirements of UK and European legislation a risk based approach was adopted. After researching previous games reviews and existing event plans, it became clear that a new more focussed approach was necessary.

Developing an Effective Approach

Given the high degrees of complexity and existing statutory frameworks in place, the first step was to seek legal counsel advice to better understand the duties of the various stakeholders and the framework under which safety should be managed. This guidance shaped the processes and functions put in place over the remaining years.

From the guidance provided, the literature reviews and analysis of previous Olympic and non-Olympic events the safety objectives were formed. Essentially the objective was to maintain the pre-Games levels of safety throughout the Games period - therefore responding to the elevated level of risk through additional controls.

As a planning and funding organisation, the ODA had responsibility to fully understand its plans, risks and controls and to assure itself and its stakeholders that they were discharged in a safe manner. The assurance would be provided via a documented 'Readiness Safety Case' that was built up from an evidence base gathered through incremental testing and readiness exercise. This



was within the context that the safety obligations should always rest with those most capable of discharging them and that existing levels of risk tolerability would be adhered to as a minimum.

Therefore the following activities were undertaken:

- Baseline risk analysis undertaken and completed of all venue transport hubs and transport interfaces. This resulted in the identification of significant hazards and risks at peak days, events and transport hubs
- Strategic and tactical safety controls developed, based on a mixture of existing and new control measures. This included the use of transport flow modelling and Quantitative Risk Assessment, TDM and additional transport infrastructure programmes being delivered
- Safety management structures based on understanding of the change to Business as Usual travel, and comprehensive risk assessments conducted jointly with LOCOG and Delivery Partners
- Establishment of the Transport Safety Board to provide a robust forum for interrogation at each stage of delivery
- Establishment of a multimodal “Testing and Readiness” Group
- Collation and use of information from previous Games and events ensuring good practice and learning in risk management
- Use of Geospatial Information Systems (GIS) to model demand and capacity at significant points of access and egress (such as Stratford Station passages), swept path curves for park and ride turning circles and routing strategies
- Integrating identified control measures into Venue Transport Plans and Operational Plans
- Assurance, monitoring and inspection undertaken throughout to ensure effective planning controls in delivering planned risk mitigation. This included readiness and testing programmes developed in partnership with transport partners and operators to test arrangements and build any identified improvements into the Venue Transport Plans and Operational Plans

- Delivery of a Transport Readiness Safety Case which documents how these activities were delivered and verified. This was developed over 36 months, based on initial legal advice, extensive reviews and interviews with a wide range of internal and external stakeholders, including transport undertakings. At each stage through to completion, the case was reviewed through the Transport Safety Board
- Rapid response teams integrated to deal with incidents (mobile via motorbikes and cars etc)
- Quantified Risk Assessment. As a complex transport project, appropriate techniques were utilised to demonstrate that the risks were as low as reasonably practicable
- Integration of Safety controls into the Transport Readiness and Testing programme
- Development of BS OHSAS 18001-2007 safety management system with its corresponding external challenge on a periodic basis (Lloyds register accreditation body) through the audit process

The significant activities were:

- Use of the modelling undertaken to identify increases in demand
- Three phases of Venue Transport Hazop workshops were planned and delivered. They initially concentrated on planning and infrastructure design then developed to address operational readiness. The final stage sought confirmation that residual risks were effectively managed
- Additional risk modelling was undertaken to develop a risk profile for each transport mode, concentrating on transport modes and venues to quantify current safety risk levels, and to forecast changes due to the Olympics and Paralympics

Assurance to Confirm Risk Management

Assurance activities were undertaken throughout the programme to confirm the implementation of planned activities and their effectiveness in delivering the appropriate control. These included:

- Completion of Phase 3 of the Hazops and closure of actions on the Hazard Log, the audits and testing outcomes provided confidence that operational arrangements were adequate and that safety arrangements were equally suitable and sufficient, and where appropriate, that remedial actions or additional steps identified were addressed
- Detailed design reviews of park and ride sites. Early safety reviews were essential in ensuring that safe operations could be achieved and risks managed. Site visits were conducted to ensure that the designs would work and that access and egress was appropriate and did not import risk to background users
- A comprehensive testing and readiness programme was developed in partnership with Operators, Stakeholders, Regulators and Delivery Partners. This programme was designed to test the arrangements for Games time and to build learning outcomes into transport plans and confirm C3 arrangements were appropriate, effective and understood by all parties
- The evidence and feedback obtained through these activities was used to update relevant risk assessments and to confirm that the reasonably foreseeable risks, identified through the assessment activities, would be managed as low as reasonably practicable. Assurance was provided through monthly reports to the GTB.



The Strategy in Action

The final test event took place in May 2012. This was followed up immediately before the Games using a rehearsal of the opening ceremony. Both events were a success from a safety perspective.

Games Time transport was mainly provided through existing operators, although there was an element of ODA directly delivered services (e.g. Bus & Coach, Park & Ride and Spectator Malls). A structured approach to procurement was adopted including the pre-qualification of suppliers against requirements for safety management and safety competence. For directly delivered bus and coach services the ODA identified a single nationwide operator to lead on safe delivery.

Within the 'supply chain' there were escalated levels of assurance that were based on the principle of appropriate intrusion. Each Transport Delivery Partner, provided assurance to the GTB through monthly reports on their operations. This was supported by the suite of venue reviews completed by experienced external advisers looking at all operational arrangements, including safety.

Throughout the Games the roving safety team responded to incidents and collected various data for analysis. This is currently being analysed but provisionally, the objective of maintaining pre Games levels of safety was achieved.

The process adopted and implemented by the ODA and Transport Delivery Partners demonstrated that:

- The size and nature of transport for London 2012 was understood and that transport plans addressed the safety risk through operational, organisational and infrastructure improvements
- The process for hazard identification and risk assessment was robust and commensurate with the complexity and nature of the project
- The Hazard Logs actions were tracked and controls implemented
- The ODA and LOCOG plans were supported by the operational planning and controls implemented by the operators and transport Delivery Partners

Key Lessons Learned

- The importance of working together from an early stage as many risks are shared and need to be clearly defined and managed. Constant challenge is required through external and independent audit / review
- The need to invest in safety management early in the programme and to ensure that this is embedded through the supply chain
- Don't underestimate the weather and its impact upon safe operations
- The use of demand forecast modelling to identify increase or change in Business as Usual risks and to use this to inform the risk assessments and control activities
- The benefits of GIS to support safety decision making asset management and operational delivery
- The importance of cross modal and independent membership of the Transport Safety Board to provide scrutiny to the process
- The need for a robust but sensitive assurance process including the readiness and testing programme to ensure that planned controls deliver what was expected
- The ability to update and amend controls as learning is gained through reviewing previous events, conducting desktop tests and live exercise events
- The value of onsite safety support to oversee and assist during operations
- The production of a safety case that clearly tells the story and provides evidence that objectives have been met. The process of writing this in itself ensures that any gaps are recognised and addressed

Security



The secure travel of the athletes, media, VIPs, spectators and the public was of paramount importance during the Games.

The key to providing safe and secure transport was an integrated approach to planning between transport modes, involving Games organisers, Government, police forces and transport operators. It was important that the implementation of security measures also took account of the need to minimise the impact on transport operations.

The complex transport security challenge for the London 2012 Games required close and effective partnership working across the transport industry, police and central Government to ensure continual sharing of information and the flexibility to adapt to whatever happened.

Work on transport security started during the bid phase, and from 2007 there was a dedicated ODA Transport Security team. In addition a joint Project Coordination Office for the Olympic Transport Security Project, was established by ODA, DfT, British Transport Police and the National Coordinator for Olympic Transport Security, to coordinate transport security and manage the interfaces with the Olympic Security Directorate Programme.

To communicate the transport security vision and deliver its implementation, the team produced a number of key documents, including the Transport Security Strategy and the Transport Security Management Plan.

As part of the delivery framework for the Olympic Transport Security Project, modal working groups were established for aviation, maritime, rail (including TfL services) and road.

To address key areas of risk, the modal working groups carried out national-level risk assessments for the additional risk of the Games to their respective modes. These assessments were kept under review and formally reviewed annually.

Venue-level transport security risk assessments, coordinated by British Transport Police and the relevant venue police force and supported by the transport security Project Coordination Office, were carried out for each venue. These were informed by the national level transport security risk assessments and drove the measures in the venue transport security plans.

Police Forces across the UK working in partnership with Local Authorities and the Private Sector played a key role in identifying and assessing risks following the Comparative Risk Assessment Methodology.

Participating Police Forces included British Transport Police, Metropolitan Police Service, Dorset, Essex, Hertfordshire, Surrey, Thames Valley, Kent, Sussex and those for the Regional Football Venues: Greater Manchester, Northumbria, South Wales, West Midlands and Strathclyde.

This comprehensive and thorough process ensured all parties played an active role in the risk assessment.





British Transport Police and venue police forces then co-ordinated venue transport security mitigation plans to respond to the identified risks, using the headings below as a guide. All understood that the responses had to be realistic, manageable and financially sound, including:

- Communications & Co-ordination: Confirm procedures for reporting security and other incidents, and for sharing information with each other, NOCC and TCC
- Aviation, Landside Security Plan: Include Olympic additionality within Airport Security Plan describing and enhanced or alternative security arrangements which will be put in place during Games Time (if relevant)
- Maritime, River Thames Service & Pier Infrastructure: Prepare a River Thames Policing Plan if relevant for the venue
- Maritime, Inland Waterways and Tow Paths: Prepare an inland waterways policing plan in conjunction with Site and Venue security (if relevant for the venue)
- Rail, Gateway Station Security: All Gateway Stations have security plan(s) for the Venue
- Rail, Network Security: Describe any additional specific security rail network measures that are required for the venue. (e.g. response to intruders at rail portals to Olympic Park)
- Rail, Park and Rail Services: Agree and record which transport operator has responsibility for the security for Park and Rail sites on rail or airport property and who has responsibility for security searches
- Rail, British Transport Police Tactical Policing Plans: Tactical plans in place for all Gateway Stations to the Venue
- Road, Direct Coaches and Bus Operations: Confirm full compliance with advice in DfT Transec's Bus and Coach Security – Recommended Best Practice
- Roads, Park & Ride: Security plans in place for all Park and Ride sites (both strategic and venue based)

Following the production of the mitigation plans, the transport security project Project Coordination Office worked closely with British Transport Police and the venue police forces up until the start of Games time to gain assurance that the planned mitigations would be in place and to assist in resolving any issues.

The Strategy in Action

Throughout the Games vigilance across the transport domain was high. Staff were properly briefed, trained in security and aware. There were no terrorist attacks.

This was the first time security for a major event has been tackled in this wide-ranging, integrated way and future events will benefit from learning these new transport security practices.

The risk assessment process chosen was particularly effective because it took account of the national, modal perspective but allowed stakeholders to look at how these should be applied at the venue level.

As vigilance is the primary tool against crime in all its forms, ODA sponsored British Transport Police to produce a security awareness and vigilance video-based briefing that was shown to more than 90% of rail operating staff in the six months before the Games and was approved by DfT to be the annual staff security briefing. It is available in post-Games version for legacy use and has found interest among several other non-rail stakeholders. It was exceptionally well received by the industry.

Key Lessons Learned

- The experience of developing an integrated approach will be of benefit to future transport security planning for major events across the UK
- The risk assessment process chosen was particularly effective, both in how it encompassed national and local dimensions and also in how the outcomes were jointly owned by all stakeholders
- The cooperative relationships established in the development of the Games transport security approach need to be maintained and built on





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Travel Demand Management

The London 2012 TDM programme was designed to influence travel behaviour so as to mitigate high levels of forecast demand that would have resulted in unacceptable queuing on roads and public transport during the Games.

The Programme provided information and advice to three key audiences in order to enable optimal travel patterns:

- Businesses
- Spectators
- Regular travellers

The programme was implemented by ODA until 2011 and then by TfL thereafter. It was national in scope and covered both public transport and road impacts. Delivery was coordinated on a partnership basis between all relevant transport agencies.

The programme was extremely successful, with an average of 35% of adults in London modifying their travel behaviour on weekdays during the Olympic Games.

Following the Olympics, TDM messages were adjusted to focus on the particular parts of the transport network, and times of day, in which congestion was forecast, based on the different footprint of the Paralympic Games. This messaging was also effective, with 31% of adults in London reporting that they had changed their travel behaviour on weekdays during the Paralympic Games.

Consequently, the forecast queues and travel disruption did not emerge, despite extremely high levels of public transport use. A record 4.5 million journeys were made on London Underground during a single day in the Games. 62 million journeys were made on London Underground, 35% more than normal. In the Paralympic period on some days Tube passengers were up by 25% compared to the same period last year.

On the roads, traffic in central London was typically down by around 15 per cent during the Olympic Games and by 5-10 per cent during the Paralympic Games, with many drivers taking the advice to avoid driving near the Olympic and Paralympic Route networks and near venues. During the Paralympic Games larger reductions were experienced in east London than in central London, indicating that the targeted messaging was effective.

During the Olympic Games, only around 40 per cent of Games Lanes were typically in operation each day, with the remainder managed flexibly and opened to all traffic. During the Paralympic Games only around 30 per cent were typically in operation.

TDM leaves a legacy of enhanced communication channels, better relationships between transport operators and increased flexibility in public behaviour. Most significantly it has demonstrated that travel behaviour can be influenced over a sustained period in order to make most efficient use of transport and provide greater value to London's businesses, residents and economy.

The Drivers for the Programme

From the earliest days of London's bid to host the 2012 Games, concerns were raised about the ability of the transport network to cope. The Olympic Games were to be held in the heart of the city, with a total of 12 venues spread





transport network was already extremely busy, even prior to the addition of spectator demand. Although the Paralympic Games is a smaller event, geographic concentration of the venues in the City and East London meant that at certain places transport was expected to be under as much pressure as during the Olympic Games. Moreover, during the Paralympics, the Autumn school term would begin, meaning that usual seasonal reductions in demand could not be relied on.

On the roads the Olympic and Paralympic Route Networks (ORN/PRN) for athletes, officials, journalists and others would be introduced. The ORN/PRN reduced capacity on a number of key roads in London and required traffic management measures to protect it.

Although significant investment was made in enhancing public transport capacity and reliability on routes to Games venues, it was acknowledged by TfL and others that demand could exceed capacity at certain times and places during the Games, posing a risk to the travel of individual members of the public, to business operations and to the city's reputation.

This led TfL, ODA and Government to set up a programme to manage transport demand during the Games.

This approach was endorsed by key stakeholders: 'Alongside new infrastructure, managing demand for transport will be crucial to meeting the 2012 transport challenge. Around one-third of Londoners may need to change their usual travel patterns if the system is to operate effectively next summer.' (Assembly Transport Committee report - Clearing the Hurdles: Transport for the 2012 Olympic and Paralympic Games, April 2011)

It was essential to provide some substance and precision to concerns about transport in order to inform and reassure businesses and transport customers.

TfL, the ODA and LOCOG worked together to forecast where, and when, impacts would take place on each day of the Games.

The modelling enabled queue times, if there was no change in behaviour, at every station in London to be predicted. Modelling also identified where and when the road network would be under particular pressure as a result of Games operations.

These analyses reinforced the assessment that transport pressure was specific to particular times and places. Impacts would vary on different days depending on the competition schedule. The analysis showed that without significant behaviour change then queues of over 30 minutes would form at certain stations for sustained



periods. Similarly on highways a number of critical areas were identified, particularly in the area between the North and South Circular.

At those locations and times that were affected an unprecedented level of change would be required by regular travellers if the additional spectator demand on public transport, and Games Family demand on highways, was to be accommodated without substantial impacts.

The TDM programme was designed to work alongside operational management to achieve a target level of behaviour change to mitigate impacts at transport hotspots. Spectators would be assisted to make sensible transport decisions and choose routes that would not exacerbate pressure in particular locations. Regular travellers were to be encouraged to retime, reroute, reduce or revise the mode of their travel. Businesses were to be supported to make operational changes, securing their own resilience and enabling their staff and suppliers to alter their travel patterns.

The scale of change targeted by TDM, at 30% of regular travellers in hotspots, was ambitious and challenging - reservations were expressed as to whether it could be achieved:

‘for the fact of the scale of reduction in background demand that is required we believe

that the reduction in background activity may not happen on the scale that TfL, ODA and LOCOG expect.’ (London Travel Watch submission to the Transport Select Committee inquiry on the Games, March 2012)

‘We remain concerned about the likely unprecedented demand for access to roads and the public transport network during the Games.’ London Councils.

The Programme in Action

The overall methodology was to provide accurate, robust and authoritative information to all audiences in order to help them plan. This information was developed in partnership with transport operators





including the HA, ATOC, individual TOCs and NR. This information was then packaged by TDM and cascaded to Delivery Partners and to the target audiences to ensure a common and integrated understanding of the challenges. Prior to the Games a series of daily factsheets, covering every day of the Olympic and Paralympic Games, was developed. These were developed into website bulletins giving a daily view and provided a foundation for a wide range of daily communications and press activity.

Boris Johnson's pre-recorded announcements on stations encouraged those using public transport to use www.getaheadofthegames.com to plan their journeys.

A critical requirement was that customer information be delivered seamlessly and coherently across all delivery organisations. To achieve this coordination the overall TDM programme was steered by a Project Board chaired by TfL and consisted of representatives from the ODA, Government Office of Communications, the DfT, LOCOG, HA, ATOC, GLA and TfL. To ensure that transport advice and messages were integrated within the wider programme of communications around the Games, TDM messaging was fed into the 2012 Communications Board, which brought together all relevant communications teams across a range of domains to ensure messages were correct and consistent across all channels.

The detail of the programme differed depending on the audience.

Businesses

General Engagement with Business Groups

TDM worked with business groups from Spring 2010 onwards. This provided a means of communicating with businesses through their industry bodies. A total of 150 business groups agreed to support the TDM programme,

representing over 200,000 businesses. This provided a broad-based channel for advice and information to go directly to businesses over the subsequent 2 years.

Site Specific Advice

Larger businesses, employing more than 200 people in hotspot locations such as the City of London, Canary Wharf, Weymouth and Portland and Eton Dorney, received direct support to develop Games time Transport Action Plans. A total of 550 companies, employing over 600,000 people in transport hotspots, primarily in London, participated in this programme.

Self-help

A toolkit was developed to assist businesses in assessing their vulnerability to predicted transport conditions and enabling them to develop contingency plans. The toolkit consisted of information, advice, case studies, templates for certain tasks and video seminars. Since the end of March 2012 the business toolkit has been hosted on the Get Ahead of the Games website. Since then 272,535 pages of information have been viewed by users.

Workshops

Action-planning workshops were held at venues across London to assist businesses, particularly SMEs, to develop draft Games time Action Plans. 2979 businesses attended workshops between Summer 2011 and June 2012.

Communications

A variety of direct and indirect communication methods were employed to raise awareness among businesses and push them to make use of the self help toolkit and other resources:

- Presentations: TDM staff and staff from local authorities joined events organised by third parties in order to promote business-relevant information and advice. Presentations were made to 21,786 businesses in this way.

Business were keen to host meetings and these helped deliver the consistent message

- **Advertising:** A marketing campaign directed to businesses was implemented from November 2010. It incorporated advertising in trade journals, an 8 week series of inserts in City AM and printed adverts in the Evening Standard and Dorset Echo. A specific campaign on the theme of preparing for alterations to delivery and servicing was implemented by TDM (and also included outdoor and radio advertising)
- **Direct Contact:** An initial direct mail to 200,000 businesses took place in Spring 2011. This featured a letter jointly signed by the TfL Commissioner for Transport, Peter Hendy, and Lord Coe. A second direct mail was particularly targeted to SMEs in hotspot areas. This saw c.42,000 information packs sent in February/ March 2012. This was followed by a door-knocking exercise in which information packs were given out. A further 20,000 packs were distributed
- **Events:** A number of high profile events for businesses and business leaders were organised to promote the advice to pre-plan. These included a conference at ExCel in 2010, with presenters including the Minister for Transport; in November 2011 launching detailed demand forecasting information with presentations from the Commissioner for TfL and the Secretary of State for Transport; in January 2012 launching the Get Ahead of the Games website and featuring the Mayor of London and the Secretary of State for Transport; in March 2012 at the Royal Opera

House and in July 2012 in the City with the Mayor of London and the Secretary of State for Transport again emphasising the advice to businesses

- **Daily Bulletins:** During the Games a twice-daily email was issued to businesses at 4.30am and 2pm, giving advice on the day and following day to come and providing material for them to cascade to their staff. This allowed the latest updates and advice to be communicated

Spectators

Games Travel Pages

TDM produced detailed information to enable spectators to plan their travel which was hosted on the London 2012 website from March 2011. This was coordinated with the opening of the LOCOG ticket ballot, to ensure that potential spectators could make informed decisions about which tickets to apply for. It meant that transport advice was integrated into spectators' planning from the outset.

Spectator Journey Planner

A bespoke Spectator Journey Planner (SJP) was developed, enabling journeys to be planned from anywhere in the UK to any Games venue using any of the modes available at Games time, including Olympic-specific coach services. The SJP enabled customers to book and pay for transport tickets up to a year before travel. This was launched in July 2011 to coincide with the confirmation to spectators that they had been successful in securing tickets. They were advised to begin planning their travel immediately.





HURRAH!

Go Team GB

The SJP was promoted via a rolling series of emails to ticket buyers, with 10 sent between September 2011 and July 2012. As of 1 September 2012 2,491,758 unique visitors, equivalent to nearly 90% of ticket purchasers, had used the SJP.

Routing Strategies

A technical innovation never previously attempted was incorporated in the SJP. This was to force the planner to return particular journeys that encouraged spectators to avoid transport hotspots in order to make best use of transport capacity. This was based on a bespoke series of routing strategies developed by TDM in conjunction with transport operators.

On-system Guidance

TDM worked closely with transport operators to provide on-system information to spectators, for example ensuring that designated venue stations were announced by staff and pre-recorded information and were integrated with station and last-mile signing.

OIS and ESubs

During the Games both planned and real-time transport advice was made available to spectators when on transport systems. In addition to usual information and updates, advice on routes to take and locations to avoid was also provided to spectators via upgraded service update boards in TfL-run stations and a new network of c300 plasma screens in national rail stations, bringing the total to around 400. These screens were used to provide information and updated routing advice to spectators in the event of transport incidents. They were also used to provide information regarding crowding at road events and Live Sites in order to discourage spectators from heading towards already crowded locations.

Digital Information

In addition to on-system channels, communication to spectators was also provided in real-time for those not yet on the transport network. This was used to route spectators away from transport difficulties in the event of forecast transport pressure or operational incidents. The information was developed cooperatively with all affected operators in the TCC. It was then delivered uniformly through a range of channels. Those operated directly by TDM included the Get Ahead of the Games Twitter Feed and the London 2012 Join In app. At its peak Get Ahead of the Games had 62,594 twitter followers after being launched in January 2012.

The information feed for the SJP travel alerts was also provided to broadcasters, ensuring that travel advice for spectators was also relayed via travel news bulletins from a wide range of media outlets including the BBC.



Regular Travellers

Get Ahead of the Games

A website – Get Ahead of the Games – and twitter service was launched in January 2012 to provide a gateway for regular travellers to all the information they might need to understand how their journeys could be affected and plan alternatives. As of August 2012 the website had had over 16 million page views and 4,663,464 unique visitors.

Get Ahead of the Games provides a range of interactive tools, links to journey planners and advice to enable users to see where and when transport services were, and were not expected to be affected. Links to planning tools were provided directly from the site.

Marketing

An integrated Get Ahead of the Games marketing campaign was launched in January 2012. The campaign was primarily aimed at background demand. It used all advertising channels with the exception of television. Additionally a series of PR events were held in key hotspots such as London Bridge. The marketing campaign was in three phases:

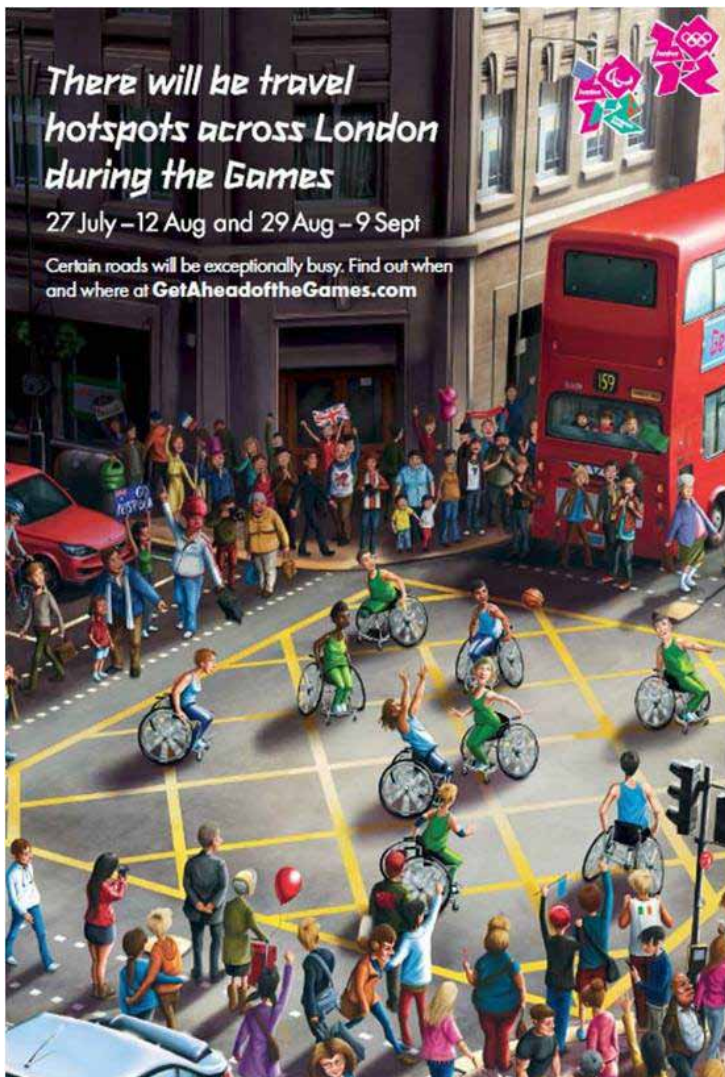
- Communicating that transport was expected to be affected at certain times and places. This phase emphasised the scale of the Games and the scope for journeys in parts of London other than Stratford to be affected. The call to action in this phase of the campaign was to direct people to the Get Ahead of the Games website. This phase ran from January to March
- Encouraging people to consider alternatives to travelling through hotspots, including

changing the time of their travel, taking a different route, working at home on the busiest days or changing to less busy modes, particularly walking and cycling. This phase ran from April to June

- Urging people to make the changes that they had planned. Following research that indicated that many people were intending to travel as normal when the Games began and then decide whether or not to change, the public was advised 'don't get caught out' and 'don't chance your travel'. In order to give prominence to this pre-Games message, recorded announcements featuring the Mayor of London were developed and played in June and July 2012

Walking Maps

To encourage regular travellers to walk the last stages of their journeys from mainline stations in London, rather than interchanging to public transport, a series of walking maps were developed for every mainline terminus station in London. A total of 4 million of these were distributed to regular travellers between May and July 2012.



Customer Email

Using TfL's customer database bespoke emails were sent to customers prior to, and during the Games. These were targeted to people who had signed up to receive alerts. They were focussed around information reflecting the usual travel patterns of the individual, highlighting lines and stations regularly used by the individual. Emails concerning road impacts were also sent to TfL customers known to use highway modes.

During the Olympic Games the TfL customer email system was used to send a daily update. A total of 27 million emails were delivered prior to the Olympics and 60 million during the Olympic Games by this means.

During the transition period and the Paralympic Games over 20 million further emails were sent direct to customers. During the course of the overall programme, 107.5 million emails were sent directly to affected users of London's transport networks.

Travel Advice and Updates

The TfL Journey Planner was modified in the run up to, and during the Games. Users planning journeys that would take them through transport hotspots were warned of the possible transport impacts and advised to consider alternatives. This was a highly targeted way of providing detailed information to relevant customers. Nearly 71 million journey planning sessions were carried out on the TfL journey planner from May to 6 September.

Information about the changing impacts of the Games on transport was also provided via a number of real-time channels in addition to the regular on-system channels. Primarily this was via the Get Ahead of the Games twitter account, which gave planned updates on which stations/lines/roads were expected to be affected each day and provided updates on incidents.

During the Games

The development of the TDM programme was supported from the outset by a programme of research. This tracked the level of understanding, intention to change behaviour and planning activity of all the target audiences. This gave reassurance that the programme would deliver the required reduction, but there could be no certainty until the Games actually began.

Once the Games commenced, despite prior concerns, transport ran well and significant overcrowding was not experienced. This was as a result of the behaviour change that was achieved.

Evidence indicated that Londoners listened to TDM advice and modified their behaviour. An average of 35% of Londoners changed their travel every day during the weekdays of the Olympics.

During the Paralympics, despite the different geographic focus and the end of the school holidays, an average of 31% of Londoners changed their travel every day during Paralympic weekdays.

Predicted levels of crowding were averted even though the transport system carried record numbers of passengers, with over 62 million people carried and a record 4.5million carried on the tube alone on Tuesday 7 August.

Numerous compliments were received in the press about the non-emergence of transport problems indicating that both the risk to journeys and the reputational risk to London was mitigated. Compliments were also received from passengers about the range and value of the travel advice they received.

Nearly 75% of respondents to survey research indicated that messages delivered by the TDM programme had been relevant to them. Nearly 80% of respondents had found the advice about busy stations useful and over 80% had found the advice about delays on particular roads useful.

Although TDM was highly effective in achieving its objectives, it nevertheless depressed demand on routes where sufficient spare capacity existed for a greater volume of passengers to be carried.

A more finely tuned, targeted approach may have avoided this outcome. In addition, TDM needs to adapt quickly to changing patterns of demand during the course of the Games themselves.

Key Lessons Learned

- The TDM programme has demonstrated that travel behaviour is flexible and that it can be influenced at a large scale to enable more efficient use of transport capacity
- Joined up delivery has been achieved across a wide range of transport operators including London Underground, DLR, London Overground, NR, South West Trains, Southern Trains, South Eastern trains, the HA, the DfT, TfL Customer Services and others. These relationships need to be maintained as a basis for continued integration of information and improved service to all customers
- New approaches to customer information have proved very successful including incorporating routing strategies into journey planning tools; innovative use of social-media to give real-time advice to route customers around incidents; and the use of electronic media such as service boards to carry customer advice
- TDM needs to be as specifically targeted as possible in order to avoid unnecessarily depressing background demand and to be highly adaptive to changes in demand patterns as they emerge



DLR



Stratford
Station



Buses at
Stratford



Taxis at
Stratford

**Testing and
Readiness**

London 2012 and its transport Delivery Partners needed to be 'ready' to move spectators in a timely and safe manner. Key to success was the end to end scheme of tests, exercises, modelling and training, targeting the points of greatest risk, particularly around volume, integrations and decision making that prepared it to deliver.

The complexity and magnitude of the task required a staged approach escalating progressively from unit tests up to the domain and Games level. This four-stage programme supported the increasing levels of maturity, and development, of the transport domain. The stages were:

- Conceptually ready – the point at which the transport arrangements were proven to work in principle
- Functionally ready – when it was confirmed that individual modes or venues could operate in isolation; new and existing capabilities within domains had been defined and were adequate for Games-time
- Domain ready – when it was confirmed that the Transport domain was ready to operate as an integrated system and in conjunction with the other Games-time domains
- Games-ready - domains were integrated with each other and met the required capability for Games-time operations for both the Olympic and Paralympic Games

The Transport Games Readiness Programme comprised tests at each of its stages. By definition, a test at any point after Stage 1 was an exercise of elements that were tested in the preceding Stage. This meant that those elements that were tested at the beginning of the programme were exercised (and, therefore, rehearsed and validated) a number of times by the end of the programme. There were six key elements of the programme:

- Contingency planning: The transport Delivery Partners established processes for emergency response and planning for contingencies. Tests and exercises of contingency plans were undertaken
- Modelling and observations: Modelling was used to test the planning for all significant transport operations and venues. This was a continuing process: further modelling was carried out up to the Games to test and validate arrangements and plans as they were developed. Modelling was also used to complement physical tests. For example, the ORN and PRN were not active until shortly before the Games began. Therefore, simulation of the ORN and PRN's impact and dependency on other modes were used to provide part of the input to physical tests and exercises

- Desktop exercises: Desktop, tabletop and command post exercises are important tools for developing and testing decision-making, information and communication paths between different parties. This was the case at all levels in transport organisations, and between these levels across organisations to ensure integration of plans to deal with identified scenarios. Desktop exercises began in 2010 and increased in intensity and complexity to ensure transport systems were robust, resilient, and could respond effectively during the Games
- Test events: Test events during the development phase challenged the people, processes, enabling technologies and infrastructure, as well as identifying weaknesses and indicating areas for modification/revision and subsequent validation
- Exercises: An 'exercise' is an event designed to verify or validate the approach (people, processes, technology and infrastructure); increasing confidence in it and the ability to implement it through training and rehearsal. The programme of exercises was focused on the mitigation of the 5 Games-wide risks:
 - Inadequate integration
 - Confused operational responsibilities
 - Inadequate decision-making processes
 - Inadequately exercised or capable staff
 - Inability to manage additional volumes





- A number of existing live events provided opportunities to test Games Readiness, while at new venues such as the Olympic Park, events were created, in partnership with the responsible management teams. Large-scale readiness events concluded the programme to validate processes and justify confidence in the transport domain as a whole. Some elements of focused testing were carried out within exercises, where relevant. In addition some scenarios were enhanced and validated further using modelling or 'virtual testing'. A number of events involved all the domains (Transport, Security, Government, Games and London). This ensured confidence that interfaces, relationships and information flows were ready and prepared.
- Training: Every test or exercise was used to help each of the transport organisations develop and train their people (enhancing skills and competence), build relationships across the Games programme, and improve the quality of planning through observing how they worked in practice. Rehearsing and practicing the delivery of Games-time transport operations ensured all participants were fully prepared and also left a legacy of efficiency and increased effectiveness

The Transport Games Readiness Programme brought together a myriad of organisations, and helped them accelerate their efforts in preparation for the Games. By drawing all the operating functions together the Transport community showed that it had prepared for the extra

challenges the Games would bring. Individual organisations retained the responsibility for making sure their own operations work, while a dedicated Testing and Exercise team made sure they worked together.

Integrated operations were prepared at key Transport-wide, and Games-wide exercises including the Transport Desktop series, Command Post-exercise (e.g. Yellow Fortius) series and the Games-wide rehearsal exercise (Red Optimus). Live activities took place throughout the programme, ranging from the successful Directly Managed Transport test at Hadleigh Farm to infrastructure tests that integrated new equipment and services. Major tests included:

- **Westfield Opening and Defence Fair Observation Exercise:** Transport Domain Observation Exercise based around the Westfield Stratford Shopping Centre grand opening in September 2011, with a second day on the following Saturday. The first day coincided with the Defence Fair at the ExCel Centre, providing a second challenging scenario for transport operators and integrated transport. The two events together provided the opportunity to assess large passenger flows through Stratford Regional Stations and associated transport hubs. In the week before the opening of Westfield, ODA sponsored a major British Transport Police desktop at Stratford International Station with more than 100 delegates from the rail industry, emergency services and government and local authorities to rehearse the co-ordination, integration and readiness of the transport systems

- **Major Domain Exercise:** 25 November 2011 was identified as the optimum time to conduct the Transport Domain LIVEX as it gave sufficient time for operators to introduce operational changes ahead of a busy 2012 including the Queen's Jubilee. Friday evening provides the largest 'background' commuter passenger numbers. Friday 25 November was a particular challenge for the transport infrastructure around the key Olympic venues of Stratford, Canning Town and North Greenwich with a 20,000 spectator swap-out at North Greenwich as 2 sell out tennis sessions produced 40,000 spectator movements at about 18:00. At the same time a Top Gear Live show finished at the ExCel generating a further 20,000 spectators. This was on top of Westfield Christmas shoppers and normal Friday evening rush

- OPTIC and TCC were stood up and the rest of the C3 architecture conducted a series of live and scenario based events designed to test communications, passage of information and decision making cycles. London Underground conducted a live test of asset management and Olympic timetables and other operators also used the opportunity to test their Games-time operations.

- **Directly Managed Transport Hadleigh Farm Exercise:** the principle exercise for ODA's Directly Managed Transport Bus and Coach service was tested as a function during the LOCOG test of the Hadleigh Farm venue. This provided confidence that this new transport provision will deliver its Games obligations

- **TCC Wreath Series.** The TCC' programme of activities delivered a Functionally Ready organisation by the end of 2011. People, processes and infrastructure were progressively exercised, integrated with the TCC, with C3 nodes in other domains and with transport operators

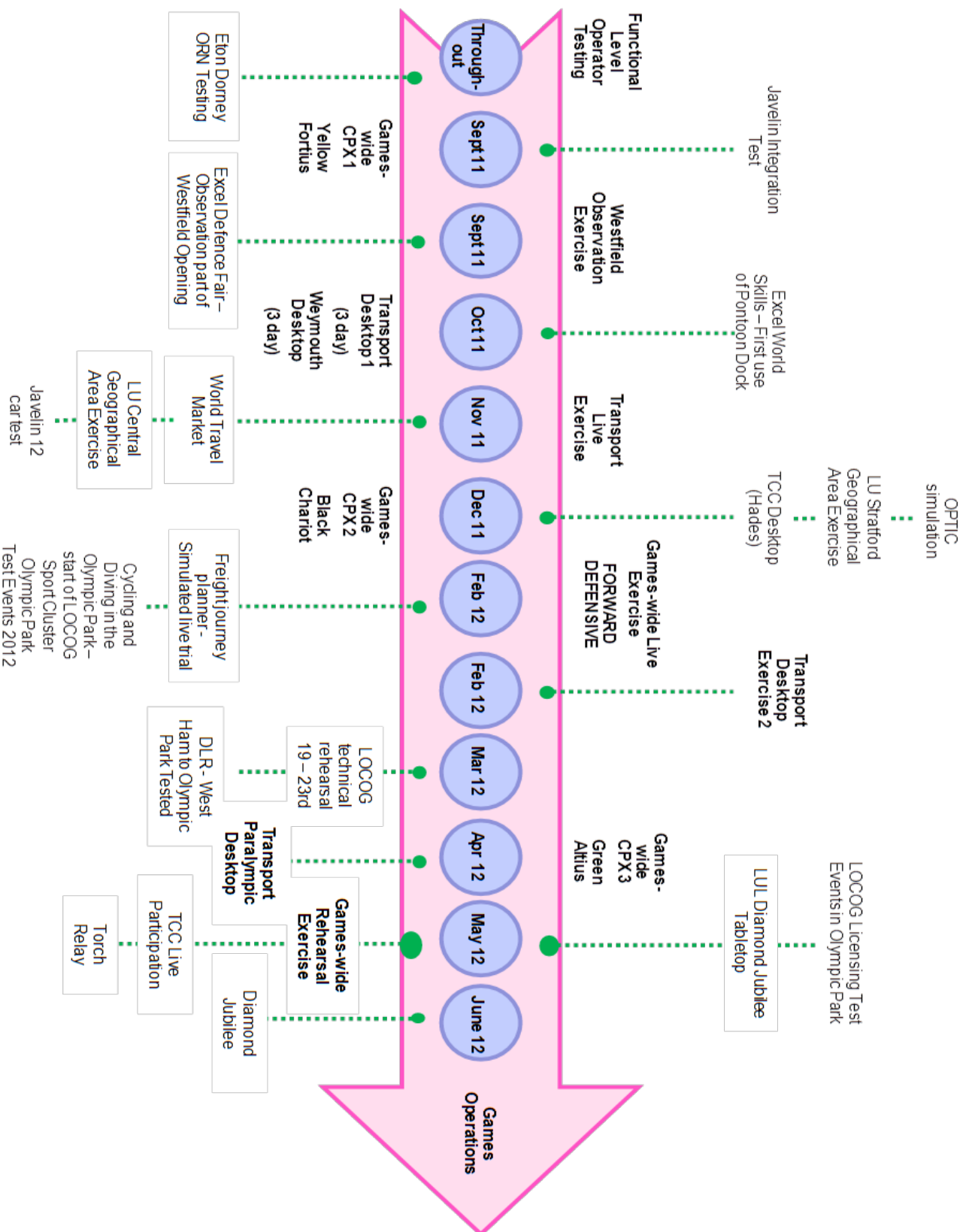
In addition the transport operators' tested new Games-time components and exercised existing or modified components. For example:

- NR: Javelin® at St. Pancras International; transport operations where there were large numbers of additional/more complex passenger movements, for example at managed stations
- DLR: tests and modelling eg the extension and staffing of platforms
- TCC: workshops and multi-domain exercises
- TfL and its subsidiaries: exercise on a regular basis and run live events every week, also Jubilee line and other upgrades; ORN and PRN
- HA: extended responsibility (for example, ORN and PRN outside London)

Delivering a Key Insight

The Transport Testing and Exercise programme provided a key insight into the preparedness of London and UK transport for the London 2012 Olympic and Paralympic Games. At the conclusion of the Olympic Games and then again





following the Paralympic Games, assessments were made to understand the degree to which the programme uncovered the right issues. In both cases it is assessed that the programme had a very high degree of success in uncovering, and reducing, issues: some of those issues identified did not come to pass as the system demonstrated its enhanced effectiveness and preparedness following a robust planning, preparedness and assurance process.

In excess of 100 programmed activities were completed across the full scope of Games transport and incorporating the full breadth and depth of UK transport.

The full support of stakeholders across the transport industry was critical to success. Consultation with the various client groups was achieved at every level: from transport and Governmental Boards to a dedicated steering group and individual exercise development and learning groups. This enabled real, fast paced change and robust outcomes that added value. Lessons were identified, tracked and managed within the programme ranging from operational issues resolved by operators to strategic problems that required Board level intervention.

All lessons from exercises were logged in a dedicated tool and were owned by the appropriate operators who reported on their progress. It was the responsibility of each organisation to demonstrate their progress against the criteria and for communicating that progress.

Some 500 lessons were identified and all were either learnt, or the associated risk accepted. This process was managed by a dedicated pan transport group alongside the bilateral relationships held between ODA and transport Delivery Partners.



Key Lessons Learned

- Considerable insight may be drawn from the way in which the programme was managed most particularly in terms of its national scope, integrated consultative approach and the flexible methodology that made the programme appropriate across diverse clients
- A consultative approach to delivery allows for development at flexible and appropriate paces across the client group along a non-linear, crawl-walk-run philosophy
- Exercising at national level early in the programme rather than on a traditional linear basis accelerates development and achieves greater concurrent activity
- By working with stakeholders to develop methods, aims and objectives of assessment and by proactively rephrasing expectations of the process it is possible to generate real enthusiasm for change
- Targeting areas of 'perceived' risk was of particular value
- Thinking 'outside the box' when developing benchmarks to create inventive solutions can yield results
- Use of multiple assessment methods is appropriate and can create savings in cost and resources

Transport Knowledge Management and Use of Technology





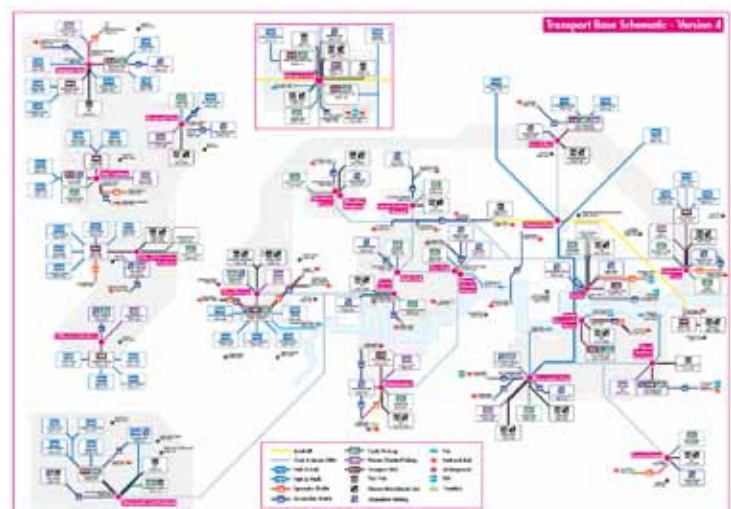
Given the large number of stakeholders involved and the multimodal complexity of delivering transport for the London 2012 Games, the ability to securely, accurately and accessibly communicate was fundamental to success. A dedicated Transport Knowledge Management (TKM) team was responsible for providing the knowledge, intelligence and systems necessary, providing leadership and support for:

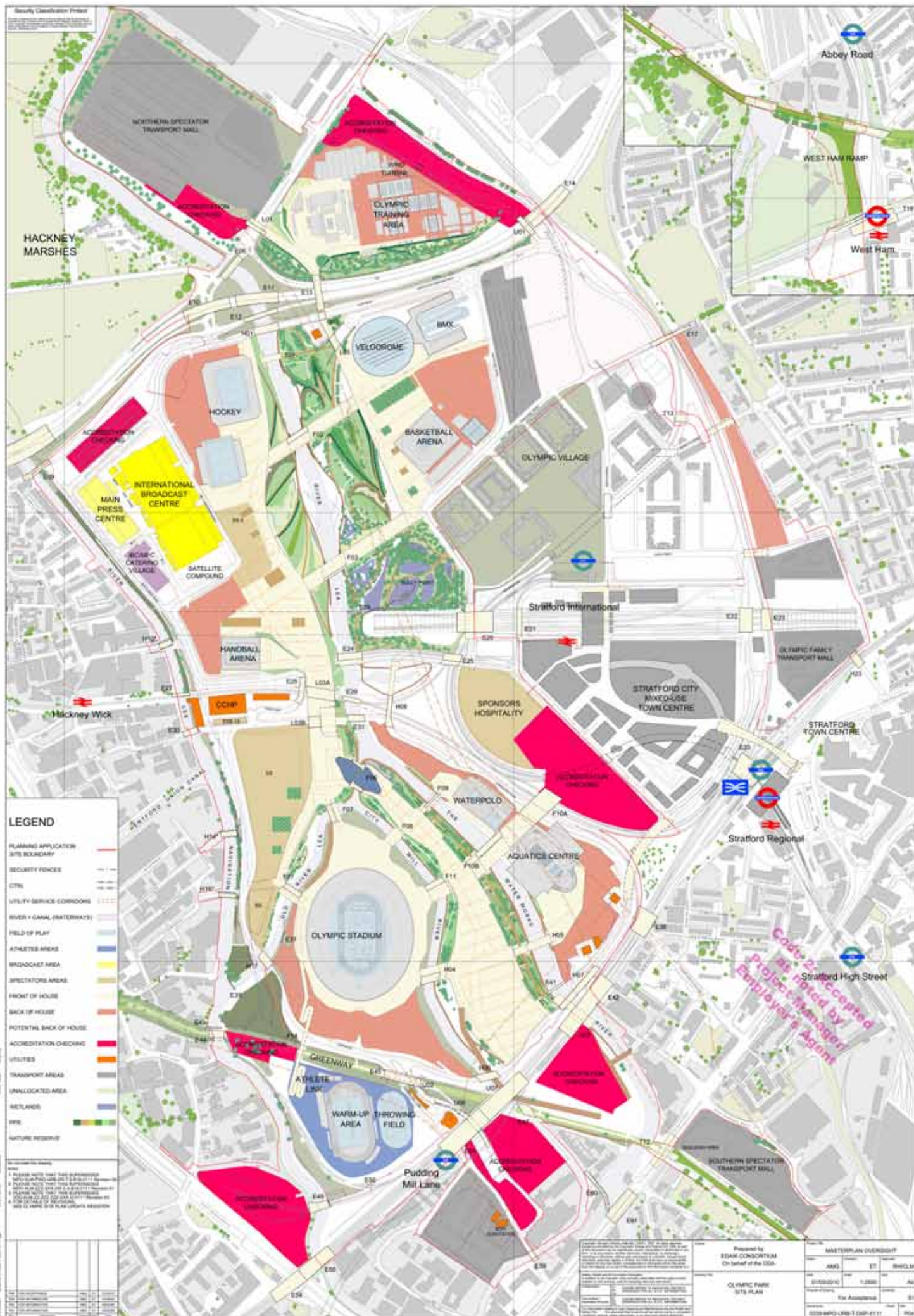
- Information design
- Mapping – GIS and Computer Aided Design (CAD)
- Collaboration environments
- Operational Information Communication Technology (ICT)
- Business Continuity and Crisis Management
- Mobile reporting
- Quality Management Systems

Information Design

To effectively visualise and communicate complex operational concepts and ensure the effective transfer of information the TKM team were responsible for information design using technical skills such as cartography and graphic design. Using inspiration from classic London designs such as Becks' underground map and marrying this with modern infographic styles and visual techniques in legibility, outputs include process mapping, staff guides, dot plans, complex Transport Base Schematics, report design, online tools and web interface design.

These highly effective visualisations helped drive the operational planning across London 2012.







GIS and Mapping

A key task was to set up and run a single source of geospatial data to be used across all stakeholders. An integrated CAD and GIS database allowed stakeholders from operations to security to create maps and obtain situational awareness of the whole UK wide operation for the Games.

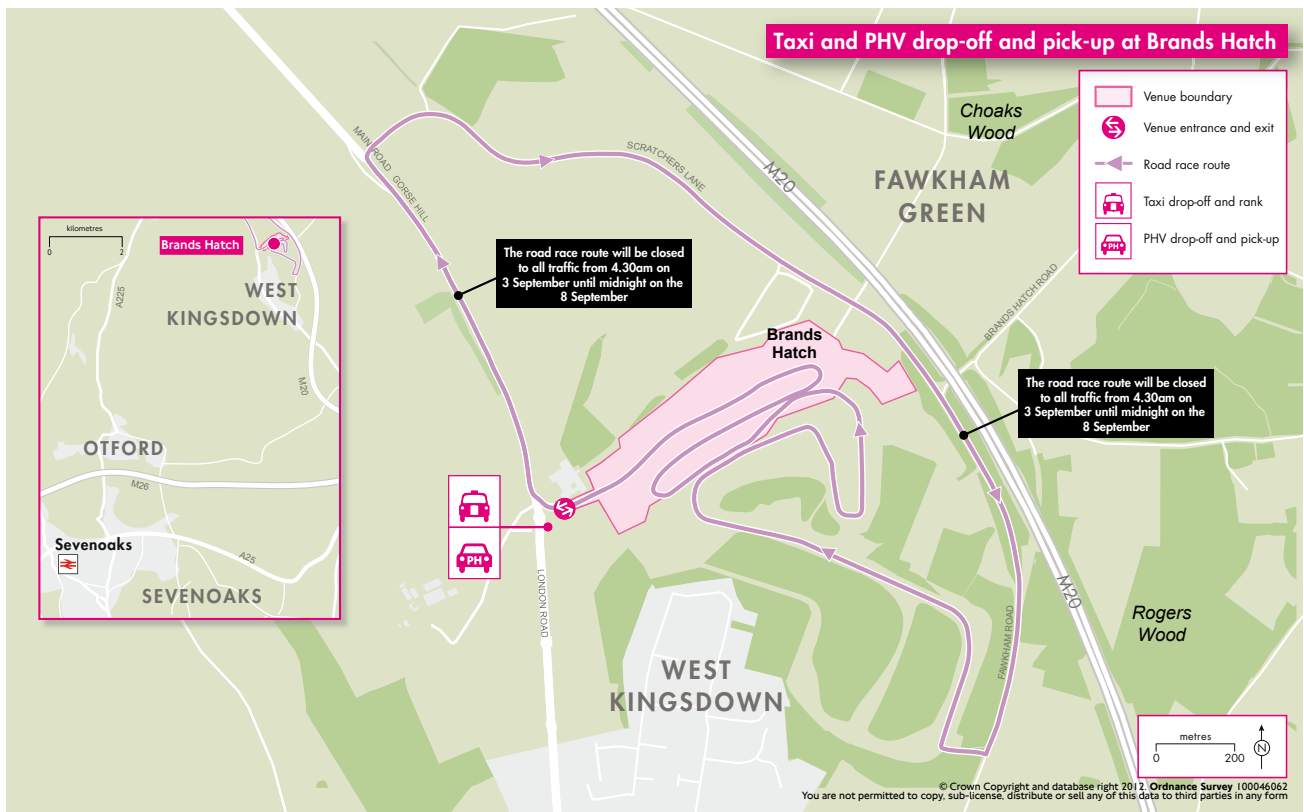
Early in the planning phase of transport the need for a way of managing the large amount of data from across the UK became apparent. With the physical nature of the works being carried out and the wide geographical spread a large number of maps were required and these needed to fit with the design works for permanent and temporary infrastructure.

A state of the art systems was implemented which allowed both CAD and GIS to coexist within an Oracle Spatial database. This was then manipulated with specialist tools from ESRI, Autodesk, Adobe and Safe. Certain bespoke elements were introduced to ensure that data met emerging standards (such as the metadata required for INSPIRE). The technical solution was supported through the development of a specialist team who were syndicated across LOCOG and TfL. All users were able to access the same database (acting as a single source of truth) and workflow management tools were put into place using SharePoint to allow active collaboration on the production of mapping for all areas of the Games.



From transport specific beginnings a bespoke service to all of the key stakeholders was developed which allowed for a clear and accurate view of what was happening where and the ability to produce maps which were used across all the planning activities including; planning applications, traffic regulation orders, spectator guides, London traveller maps, Torch Relay, bus routing, site design, overlay and various guides and handbooks.

Using cloud based mapping tools to share this geospatial information and situational awareness, greatly enhanced operations. In addition this was the first wholesale use of Traffic Order map based plans for any major event across the UK reducing delivery time and improving stakeholder communication.



Transport Extranet

The Transport Extranet was created as a platform to allow the team to share information with stakeholders and Delivery Partners.

With over 1000 stakeholder organisations - 120 with direct input to ODA plans - the need to collaborate for planning and operations meant a single platform to share information and knowledge was essential.

The site was initially designed for 300 users, however because of the range of information made available and usability, the number of users rose to more than 2000.

The Transport Extranet developed from a simple file exchange platform into a unique and highly important tool for situational awareness and knowledge transfer which was essential for stakeholder communications. This helped to bring together stakeholders and Delivery Partners to achieve a much better understanding of what needed to be done to successfully deliver the Games.

Spatial Database

A spatial database was also developed to support the planning and operations of the Olympic Games. This was used by all stakeholders in ensuring a coherent picture of the operations throughout the planning and operational phases.

Ticket Handoff

Another special programme created effective, brand-aligned links between various interconnected ticketing sites to ensure a seamless user experience.

Operational ICT

Moving from construction to an effective transport operating organisation required a complete re-think about the information communication technology (ICT) approach for the Games. Given the security threats and unique nature of the event, ensuring robust ICT was a priority, but one that called for a proportionate and effective approach.

To ensure that communications were able to support effective operations at all times, regardless of availability levels a contingency and user support approach was taken. This relied on understanding the appropriate technologies to manage security risk while making data, information and communication channels as open as possible. A multi faceted approach was developed including mobile technologies, tablets, cellular radios, collaboration sites and cloud based systems to offer simple yet effective alternatives that could be adopted in seconds in the event of a system failure. This was supplemented by a user support model that focused on the needs of the individual, in their need to perform a task, not just use a system.

Performance Metrics

The interconnected transport operations in place for the Games required a combined performance metrics approach to allow Government, senior stakeholders and media a view of the performance of the entire UK transport picture.

A combined performance metrics approach was pulled together split into three tiers:

Tier C = operator level metrics,

Tier B = High level system wide metrics

Tier A = Media and government performance indicators

These different tiers allowed existing metrics to be consolidated and aggregated with Tier A providing a one page report for use when briefing ministers and media, Tier B giving a clear picture of the status of all transport operations for Senior Transport Operators, and Tier C providing detailed performance metrics of service status for each of the major transport modes.

A working group made up of key metrics analysts within each of the major transport operators was pulled together on behalf of the Senior Transport Operators Group by the ODA. The team leading this worked through examples of the reports and the processes for pulling in the data early enough in the day to feed into the Transport reporting cycle. This required persons to work through the night to contact operators and access systems to get early views of data.

Mobile Reporting

Using cloud based technologies reduced reporting cycles from hours to seconds when collecting data from the field from across the UK, allowing clear operational metrics and situation reports to be generated in real time providing robust, slick and effective reporting for senior decision makers.

Using a combination of consumer technologies, cloud computing, information design and rapid agile development the mobile reporting solution developed built upon established web technologies and new user interfaces to allow the utilisation of electronic canvassing software, redesigned to fit the bespoke and often dynamic nature of reporting for transport at Games time. In house design and constant user testing contributed to an effective, flexible and robust solution being utilised not just in transport but in other operational areas across London 2012.

Key Lessons Learned

- A focused and detailed approach to every aspect of transport knowledge management develops a strong and positive culture, ensuring maximum effectiveness and good, timely decision making
- Use of a flexible and dynamic tool for collecting metrics data was successful and quickly gained support
- A clear approach for simple systems is particularly effective
- Operators are often reluctant to share operational performance data, however for a task as big as the Olympic Games they WERE able to do this



City Operations

The 'City Operations' programme related to the work required in Greater London outside official London 2012 competition and non-competition venues (as defined by the London Organising Committee for the Olympic Games and Paralympic Games, LOCOG). It was deemed necessary because of the unique risks and opportunities presented by the Games, and because London could not meet the requirements of the Games and realise all of the benefits of them through 'business as usual'.

The programme was partly about ensuring smooth, safe and efficient operations to support the Games and to keep London moving, and included explicit obligations under the Host City contract or activities necessary to deliver such. Other elements were non-mandatory, and were included in the programme because of London's commitment to providing the best possible experience for all groups, and to realising as many long-term benefits of staging the Games as possible. It was about matching the outstanding experience offered inside venues with an equally outstanding experience across the rest of London. Given the unique size and complexity of the event, the audience it would attract and the range of activities and attractions that were to take place on its fringes, the programme faced challenges and opportunities on an unprecedented scale. London aimed to meet the challenges and exploit the opportunities.

The Mayor of London was responsible for co-ordinating the programme, though this role was based on acknowledgement that neither the Mayor nor any single authority had the powers to direct all agencies upon whom the programme relies, and that the success of the programme therefore depended on effective partnership working. The programme provided for Games-related transport, safety/security and command, co-ordination and communication (C3) arrangements each to be co-ordinated through a separate, dedicated programme of work, with consideration of transport, safety/security and C3 issues only included where those areas of work were interdependent with other activities.

This partnership approach underpinned all stages of the programme, from scoping and planning through testing and delivery.

Programme Aims and Objectives

In July 2009, the GLA produced its London 2012 City Operations Strategic Framework which set out a vision for the Programme, as agreed by the Mayor, LOCOG and their partners to "provide an inspirational citywide experience for everyone participating in the Games in London,



to safeguard the smooth running of London in Games time, and to maximise the opportunities for legacy from this work." This vision applied equally to the City Operations programmes for the Olympic and Paralympic Games.

The Framework provided the context for the detailed delivery planning to follow, setting out the aims of the City Operations programme.

This Programme Evaluation will measure and describe success against the four core Programme aims set out in the Framework:

- Aim 1: To extend an inspirational Games experience across London, ensuring that everyone is safe, well informed and involved
- Aim 2: To showcase London domestically and globally as an outstanding place to live, visit, learn and do business
- Aim 3: To ensure a safe, efficient and mutually supportive approach to operational delivery for the Games
- Aim 4: To keep London working and moving in Games time

Under each aim, further detail was provided, articulating what success would look like with respect to each aim.





The projects that formed the City Operations Programme were grouped into the following three key areas:

- **London Experience** – which included the wide-ranging Look and Celebrations programme (including Live Sites, City Dressing, London Outdoor Arts Festival, Hidden London, Discovery Trails, Bridge Animation and Iconic Spectaculars), London House, the London Media Centre, Accessibility for Visitors, Welcome to London, Team London Ambassadors, and Our Greatest Team Athletes Parade
- **Public Services** – which included the London Events Co-ordination Calendar, Borough Disbursements, Olympic and Paralympic Torch Relay assurance, C3 and the London Operations Centre
- **Readiness and Testing**

A Central Zone Licensing, Operational + Safety Planning Group was chaired by City of Westminster on behalf of the eight borough areas it covered and all those agencies or service providers who worked or planned across the Central Area. Its role was to co-ordinate plans presented by agencies, organisations, LOCOG and others to ensure consistent, practical, viable and safe operation.

Freight Transport

TfL and the London Boroughs were also responsible for helping businesses and the road freight industry to plan for and manage the impact of the Games. This included:

- Raising the awareness of businesses and the road freight industry of the potential impacts of the Games
- Identifying those areas where the greatest impact will be felt and ensuring that those likely to be affected are informed

- Identifying and promoting the types of measures that can be used to manage and mitigate the impacts of the Games
- Working with local authorities to help introduce measures during the Games and integrate them with existing traffic management measures
- Making available the information needed by businesses and the road freight industry to plan and manage effectively their response to the Games including the launch of the Freight Journey Planner
- Working with businesses and the road freight industry to ensure a sufficient level of change is in place to enable them to function effectively during the Games; and
- Undertaking monitoring and obtaining feedback from industry to ensure that the necessary changes are being made and that businesses will continue to function during the Games

TfL, supported by the ODA, worked with a wide range of business organisations, such as the Freight Transport Association, Road Haulage Association, the Federation of Small Businesses, Chambers of Commerce, Freight Quality Partnerships and Business Improvement Districts, to ensure that knowledge about the impact of the Games was distributed to the widest audience possible. In addition, information relating to managing road freight deliveries was included as part of the wider guidance provided to businesses as part of the Travel Advice for Business programme. This information was hosted in the Business Network section of the London 2012 website.

Specialist working groups were also formed with representatives from the trade associations, representative businesses and local authorities. These groups addressed issues specific to individual business sectors, such as brewing/hospitality, couriers and construction, as well as locations outside London, such as Weymouth and Portland, which face their own particular challenges. The working groups ensured that the views of stakeholders were incorporated in London 2012 plans, as well as providing valuable feedback on the industry's response and the effectiveness of their plans.

Areas where the Games were envisaged to have the very highest impact were specifically targeted, with additional information provided regarding the local effects including details of the specific measures planned for the ORN and PRN.

Over 60% of the UK's multimodal freight passes through Stratford. The ODA worked closely with Freight Operating Companies and NR to reduce this traffic at key times during Games time to allow for robust passenger services, especially late





night from the park. Re scheduling and in some instances re-routing freight services took place.

The Games infrastructure development and construction presented opportunities for new business for rail freight operators. The ODA contributed to the upgrade of the North London Line, a major artery for freight routed through east London, creating capacity for enhanced passenger services during the Games, as well as existing freight flows. The ODA also invested in the construction of a new lock to the south of the Olympic Park, to facilitate access by water-borne freight.

The Crown Estate, in association with Clipper Logistics, set up a freight consolidation scheme to serve its Regent Street retailers. Deliveries are made to a depot in outer London, and then consolidated onto a single electric vehicle for onward delivery to retailers choosing to participate in the scheme. This has resulted in a reduction in the number of freight vehicles servicing this area, with an 86% reduction amongst participating tenants. This will have helped to reduce congestion and created a more pleasant environment for shoppers.

This encouraged other businesses such as Fortnum and Mason to introduce freight consolidation schemes as part of their preparations for the Games.

Westminster City Council briefed residents and businesses well in advance of the Games, warning that in the exceptional circumstances, business as usual would not work, particularly during road event days. This approach was successful and kept complaints about late night deliveries to a minimum. The City Council also imposed restrictions on building sites likely to affect Games Transport, including prohibiting deliveries or material removals from their site.

Key Lessons Learned

- Strong relationships were established, between GLA, London Fire Brigade Emergency Planning, Boroughs, London Resilience Partners and other 2012 domains, including transport, through coordinated planning, training and exercising. This enabled effective engagement and issues resolution
- London agencies worked in partnership to ensure that all aspects of the Games were delivered effectively
- Knowledge collateral was shared more widely. It was helpful for TfL to prepare an animated Torch Tool and Transport Playbook to assist with planning. Co-location in TCC, London Operations Centre and SOR also proved extremely helpful for flagging issues and resolution. Work is underway to consider how this could, and whether it should, be continued for future major events and normal city operations
- Businesses and freight operators are able to cope with significant disruption to normal business practice but need good information to enable them to plan alternatives



Arrivals and Departures



The London 2012 Olympic and Paralympic Games generated a significant increase in the number of arrivals and departures at airports and other ports of entry, particularly in the South East.

Ensuring a smooth arrivals and departures process for Games Family members and international spectators, whilst avoiding disruption to other travellers, was an important aspect of shaping the overall perception of the successful hosting of the Games.

The DfT led cross-agency work to plan and deliver a strategy for handling arrivals and departures which aimed to:

- Temporary extension of airport slot-co-ordination to all airports in the South East, to prevent overcrowding of airspace
- Temporary changes to controlled airspace to increase capacity, and increased collaboration with Eurocontrol and neighbouring countries' air traffic control agencies
- Temporary airspace restrictions to guard against the risk of airborne security threats;
- Measures to ensure the smooth passage of passengers through border controls, including the provision of dedicated lanes for Games Family members at the official port of entry (Heathrow)
- Measures taken by airports and other ports of entry to ensure their smooth operation under the particular demands of the Games, including the use of volunteers, and BAA's operation of a temporary terminal at Heathrow for Olympic Games Family departures; and
- Creation and operation of an A&D Hub to ensure co-ordination of Games-time operations

- Ensure all who wanted to come to the Games could do so, through efficient use of available capacity
- Avoid negative impacts on other travellers by minimising disruption to normal operations
- Ensure high standards of safety and security were maintained; and
- Deliver the best possible arrival and departure experience

Close collaboration between the many responsible agencies – DfT, FCO, MoD, Home Office, Border Force, Police, CAA, National Air Traffic Service, airport operators, airlines, private aviation, LOCOG and ODA was essential to the successful delivery of that strategy. Key measures were:

- Detailed regularly updated forecasting of demand: spectators, Games Family and Heads of State shared with relevant key stakeholders to facilitate planning
- Extensive communications to encourage early planning, particularly by business aviation and Heads of State

To facilitate the delivery of a successful and positive arrivals and departures (A&D) experience for all international spectators the ODA provided detailed A&D analytical demand forecasting both pre-Games and at Games time to facilitate planning. ODA's main focus was in supporting the travel needs for non-air A&D spectators, predominately from Northern Europe. It:

- Provided a focal point for the collection/ validation/dissemination of cross-channel travel intelligence



- Contributed to problem-solving and strategic decision-making through co-location with key agencies and direct links with others
- Worked with international Authorised Ticket Resellers (ATR's) as necessary to facilitate effective two-way communication and operational intelligence gathering
- Implemented and maintained appropriate lines of communication with international coaches, ferry and rail operators

Arrivals and Departures Hub

The A&D Hub was the focus during Games-time for collective action and information-sharing between those agencies within Government and beyond that were involved in delivering this objective. The concept of the A&D Hub was influenced by the cross agency approach to managing the arrivals and departures of guests and delegates to both the 2009 G20 Summit and the 2011 Royal Wedding. In addition, the approach applied to responding to the 2010 Icelandic ash cloud also assisted in informing the concept of the A&D Hub.

The A&D Hub consisted of the core agencies with an involvement in arrivals and departures planning during Games including DfT's Aviation Rail and Port directorates, LOCOG, the Foreign & Commonwealth Office, UK Border Force, the Metropolitan Police and the ODA. A number of other organisations had direct links into the Hub including the Main Operations Centre, the TCC,

DfT's Olympic Coordination Room (DOCR), the ports of entry and National Air Traffic Services.

The hub provided a single authoritative common recognised information picture on arrivals and departures which could be used and relied upon by all client groups for both strategic planning and for short term operation responses. At the heart of this was LOCOG's A&D database containing the known travel plans of over 50,000 Games Family members. Other data inputs came from the Border Force, airports, FCO and National Air Traffic Service, and from the ODA Transport Analytics Group, who produced a daily report for decision makers of expected demand at all major ports of entry/exit. The Hub's issue resolution role involved providing advice, seeking guidance from parent agencies or third parties, taking a decision, or escalating the matter to parent agencies or another part of the C3 structure. In addition to this, a third role was also identified where the A&D Hub would exercise an advisory and coordinating function in the event of a significant incident or emergency.

Arrivals and Departures Analytics

The Olympic and Paralympic Games attracts spectators from all over the world. These international spectators made up an important share of visitors to London over Games time. The importance of understanding demand for travel from overseas was recognised by the ODA as an essential element in facilitating arrivals and departures to ensure that international spectators had their best possible experience of the Games. This raised a number of questions:

- How many international ticketed spectators are expected?
- What countries will they come from?
- What modes of travel will they use?
- What will be the busiest days for arrivals and departures?
- Can planned transport capacity cope with expected demand?

To address the questions above, a programme of analysis was undertaken. This analysis is described in more detail below.

The importance of understanding demand for travel from overseas was recognised by the ODA as an essential element in meeting and discharging its responsibilities under the Olympic Act to facilitate 'the best possible arrivals and departures experience for all international spectators'. To quantify and understand demands a programme of analysis was undertaken.

International Spectator Arrivals and Departures Forecasting

A series of comprehensive International Spectator A & D profile models were developed with support from all internal stakeholders, major ticket resellers and transport operators.

Pre-Games forecasts of International Spectator A & D covered all ticketed spectators entering and leaving the country by air, sea and channel tunnel. Analysis was based on detailed ticketing data from LOCOG together with other data sources including the International Passenger Survey from the Office for National Statistics and airport passenger forecasts.

Games Time Role

For Games time reporting an agreement was reached with all major transport operators to share key passenger booking data on a daily basis. The collated data was combined and published daily to inform all stakeholders of the levels of demand expected for the next day and detailed key highlights and emerging trends across all significant international ports of arrival. This intelligence was used widely to plan for and manage the increased demands and alterations in traveller patterns generated as a result of the Games.

Key Lessons Learned

- The importance of close collaboration between all relevant agencies – Government and private sector – to ensure the successful handling of the arrivals and departures aspects of large international events
- Further analysis is being done of the contribution of the various aviation measures taken to the 87% reduction in airspace delay minutes that was observed during the Olympics compared with the same period in 2011, with potential lessons for both day to day management of airports and airspace as well as future special events
- Other lessons learnt work is currently being undertaken by DfT, the CAA, National Air Traffic Service, Border Force and airports
- Demands upon Arrivals and departures Hub will vary considerably with the profile of games family and spectator movements. Resourcing must be flexible to enable the efficient management of these changing demands while maintaining business resilience
- Early engagement with operators is essential to ensure the highest levels of cooperation and access to booking data at an early stage. This will directly inform and improve demand knowledge and strengthen planning

Our Legacy



There are two types of transport legacy left after the London 2012 Games – physical legacy and ‘soft’ legacy.

The physical legacy is the new transport infrastructure and facilities - predominantly rail schemes but also some highways schemes, cycling and walking routes and other projects – which were needed for the 2012 Games but which will also make a significant long-term difference to people living and working in London, particularly to the east in the traditionally disadvantaged communities near the Olympic Park. There was also a major programme of improvements that has made the rail and underground network more accessible.

The 2012 transport legacy will also continue to contribute in many ways over and above the delivery of capital projects. This is known as the ‘soft’ legacy and includes behavioural change and long term health benefits, growth, regeneration and general socio-economic benefits.

Improved Infrastructure

The first and most physical legacy is that around £6.5bn has been invested in upgrading and extending transport links to increase capacity and improve services – both by the transport operators as a part of their ongoing improvement programmes and by the ODA in additional projects and programmes specifically for London 2012. This is already providing an early legacy of better transport options, particularly for people living in east London, and which will benefit millions of people and support economic development for generations to come.

Before London won the 2012 Games, TfL and NR already had plans in place to spend £6.5 billion on transport schemes such as the East London Line, new train fleets for Victoria, Circle, Hammersmith & City and Metropolitan lines, Jubilee and Central line improvements and the Access for All programme but the Games were a catalyst for bringing these programmes forward. The ODA also contributed around £500m: some for completely new projects; some to enhance

existing projects; and some to bring forward projects that would otherwise not be completed before the Games. The ODA also contributed around another £500m on operations at Games time. Key projects essential to the smooth running of the Games but which also have a strong legacy value include:

- The ODA invested to help transform Stratford Station, and improve services on the DLR and North London Line – a legacy for Londoners in place before the Games even began
- Upgrades to transport networks have also delivered greater frequency and reliability, including on the Central and Jubilee lines and DLR. This is not something that has just happened for the London 2012 Games, it is building on improved performance and reliability in recent years
- The transport system is more accessible than ever with new lifts and step free access at stations such as Clapham Junction, Slough, Wembley and further afield at Loughborough - Team GB’s pre-London 2012 HQ. The new Passenger Assist system continues to provide an enhanced assistance booking service to disabled passengers
- The London Overground is unrecognisable from the railway that TfL took charge of a few years ago and now has new signalling, trains and refurbished stations – many step-free. It is now a frequent and reliable metro service and a vibrant and vital part of London’s transport network moving over 100m satisfied customers a year
- The reliability of Tube services has improved around 40 per cent since 2007/08 and last year the Tube ran more service, more reliably than at any time in its 149 year history. Double the number of people using national rail arrive on time today compared with ten years ago
- Innovative maintenance plans and procedures, such as the Tube’s Emergency Response Unit travelling to fix signal, track and train problems under ‘blue lights’ have also improved response times and we will seek to capture and retain such improvements as a legacy, post Games
- On the roads, TfL’s investment in traffic signal technology, Active Traffic Management – probably the largest such programme in the world – and modelling techniques will leave a legacy of improved traffic management and smoother traffic flow





Stratford Station Enhancements

Used by around half the people visiting the Olympic Park each day during the Games, the extensive capacity and access enhancements at Stratford Station, including lifts, passageways, staircases, straightening and lengthening platforms, a new mezzanine level entrance, track work and signalling changes, were all essential. The same improvements will support the continued regeneration and development of the town and its increasingly important role as a destination and successful metropolitan centre in its own right. The Stratford City development is the UK's largest retail-led, mixed-use regeneration project. 37,000 commuters were using Stratford Station each day during the morning peak in 2008, by 2016 that number is expected to rise to 83,000.

DLR Upgrade Projects

These included conversion to DLR of the North London Line between Stratford and Canning Town; infrastructure for three-car operation; an extension under the Thames to Woolwich Arsenal; and a new train fleet. The improvements were designed to act as a catalyst for regeneration in the Lower Lea Valley, bringing new jobs, homes, shops and other leisure facilities to the area and also allowing more people to access jobs in Canary Wharf, Central London and other parts of east and southeast London.

Jubilee Line Improvements

These included longer trains, new signalling and more frequent trains, which will allow greater numbers of people to access jobs within Canary Wharf, North Greenwich, Stratford town centre and the Olympic Park, also helping to support local employment and businesses within the area while improving connectivity for east London as a whole.

London Overground Improvements

These included new trains, refurbished stations, capacity to operate longer trains and more frequent services on the North London line between Willesden Junction, Highbury and Islington. This has improved 'orbital travel' - allowing people to avoid central London - and connections to and from Stratford, and within Hackney and Tower Hamlets. Access to jobs and services are improved, as well as supporting businesses within and around the Olympic Park, Shoreditch and Dalston. The new East London line links 21 stations from Dalston Junction in east London to West Croydon and Crystal Palace and links to the London Overground at Highbury and Islington.

New Cycleways and Walking Routes

Cycling in London has already more than doubled in recent years, but the Games will give it an even greater boost. The success of Team GB's cyclists on the road and the track is sure to inspire more people on to two wheels, and TfL has already seen record numbers taking to Barclays Cycle Hire bikes.

Providing the right walking and cycling infrastructure was designed to help London 2012 to meet its aim of 100 per cent of spectators getting to the Games by public transport, cycling or walking. But it is also expected to further encourage cycling in London.

Over £20m has been invested in new and improved walking and cycling routes to and around the Olympic Park, benefiting the local community for years to come. In all more than 100 walking and cycling schemes on eight routes across London – including some that link the Olympic Park – were upgraded, as well as paths linking to outer London venues. Improvements included wider paths, smoother surfaces and better entry and access points.

Hundreds of additional cycle parking spaces have been added at major stations such as Liverpool Street, Euston and Waterloo in the last three years.

Further improvements planned by TfL include expansion of Barclays Cycle Hire, the construction of further Barclays Cycle Superhighways, a junction review programme plus ongoing support for cycle training.

A major new elite and cycling participation event, Ride London, will also seek to promote London and encourage cycling from the summer of 2013.

Highways Improvements

The ORN, PRN and new TCC, will leave a legacy of improved transport coordination across London with upgraded traffic signals and new CCTV. Highway improvements have been made as part of the construction of the Olympic Park, particularly new bridges that reduce severance caused by the River Lea and railways.

Accessible Transport

The aim of the ODA's Accessible Transport Strategy was to change the experience disabled people had when using public transport during the Games and to leave a legacy of more accessible transport - access infrastructure improvements, greater awareness of disability issues, passenger confidence in public transport accessibility. An accessibility and inclusion board drawing members both from across the transport industry and groups and individuals with a particular interest in accessibility issues worked together on the strategy. It involved major investment in improvements across the network, both in London such as Green Park and Southfields and at other venues such as key stations close to Weymouth and Portland and Eton Dorney (Slough), which include step-free access, accessible toilets, additional seating and tactile platform surfaces and also new step-free routes to get to the Lee Valley White Water Centre from nearby Cheshunt station.

Encouraging disabled spectators to use public transport during the Games and experience these improvements for themselves will mean they are more likely to feel confident using it in the future, providing lifelong benefits of greater travel independence. The close working of the Accessibility and Inclusion Board will also have great legacy value.





The Games will play a key part in ensuring investment in London's transport network and will secure the London 2012 legacy

Soft transport legacy left behind after the Games includes:

Behavioural Change and Long Term Health Benefits

Hosting a 'public transport' Games and encouraging people to use environmentally sustainable and active transport, such as walking and cycling will help to encourage a shift in attitudes to travel. Better public transport, an Active Travel Programme and safe walking and cycling routes all led the way.

The Manchester 2002 Commonwealth Games showed that a shift from car to public transport is achievable if public transport is efficient, reliable and accessible. The Games estimated that more than 80 per cent of trips to the event were made by public transport. This took around 200,000 car journeys off the roads and saved around 860,000 car miles. The Commonwealth Games also showed that commuters will continue to use new travel options if they have a good initial transport experience. For example, the park-and-ride service that was successfully used during the Manchester Games was also well-used by Christmas shoppers during December 2003.

Travel Demand Management

Further soft legacy gains will come from the TDM programme which through a range of integrated methods and messaging sought to influence targeted groups to change their travel habits during the summer and autumn of 2012, to modify, defer or bring forward their journeys at Games time. Demonstrating the benefits will help to change target audiences' behaviour.

One of the key reasons why the transport network operated so smoothly during the London 2012 Games was that businesses and many Londoners followed the advice of TfL, London 2012 and transport partners and changed the way they travelled, avoiding the busiest times and places.

The majority of regular travellers did not stay out of London, they simply changed the time or way they travelled – such as walking or cycling all or part of their journeys – or took a different route. This TDM programme had the effect of 'broadening' travel patterns over the morning and evening peak hours, allowing transport networks to carry record numbers but feel less busy.

DfT, TfL, local authorities and transport operators are keen to learn the lessons from the Get Ahead of the Games campaign, to see how communication and relatively modest changes in behaviour could help make the most of the available capacity on transport networks.

TDM could also provide benefits during planned closures of the Tube or rail network for major upgrade or infrastructure works.

Much greater and more effective use was made of digital and social media channels – particularly Twitter – for the provision of real-time travel information and advice during the Games, which TfL and all transport operators will build on and seek to maintain post-Games.

The integrated event and transport ticketing information is an important innovation too. An integrated package from 'bed to seat' it sets new standards of value to other sporting and cultural events.

However, TDM needs to be used with care and be carefully and specifically targeted if it is to avoid unnecessarily depressing background demand (with the attendant financial consequences).

The bespoke SJP developed for the Games will be a model for enabling journeys to be planned from anywhere in the UK using any modes

An Integrated Transport Industry

Delivering transport for the London 2012 Games has meant working together as an integrated transport industry has been essential. The co-operation has been unprecedented - joining up national rail with the underground network, buses and London rail and connecting specialist transport groups in a way that has never been done before and across a host of themes from testing to sustainability; customer service to accessibility; safety to security; capital project delivery to governance. This co-operation is continuing and will result in better services.

For instance, the 2012 TCC has seen transport organisations from across the UK come together to share information and work together in response to issues and incidents during the Games, including integrated communication with customers.

DfT, TfL, NR and all transport operators are looking at ways to build on the success of the TCC so that it remains available and can be brought into use for major sporting and cultural events, and potentially key weather events, in future.

Ahead of the London 2012 Olympics and Paralympics Games, the Games Transport Board brought together senior representatives of all transport partners as the decision making and information sharing body for games transport. The Board provided a platform to enhance the co-operation between LOCOG, ODA, transport operators and supporting government agencies and departments. This helped develop strong relationships between the organisations, providing the foundation for an excellent operational performance during the Games, and beyond.

Programme Management

The 'light on process heavy on performance' approach led by the ODA and adopted by the transport industry, underpinned by a comprehensive assurance and financial framework, and driven by the programme, ensured delivery to time and budget and of the

quality expected by the travelling public. For the first time on this scale, a systems approach was adopted, by creating the architecture to support the transport portfolio from hard infrastructure delivery to handover and operations, whilst blending the public transport domain requirements with those of the games family, city operations and security. By taming the complexity of the task at hand and melting boundaries between the programme management teams, a precedent has been set, and what we have learned together in terms of programme management can be used for other major events in London and for other major transport projects in London. If we have done it once, we can do it ad infinitum, and give the user and taxpayer a much better deal.

Freight and Logistics

Working closely with the freight and logistics industry through a 'Freight Forum' ensured the delivery of goods and services was carefully planned and encouraged people not to make non-essential road journeys in central London and around venues. This legacy of increased engagement with the industry will be of benefit for the future.

Many logistics firms, breweries and supermarkets, to name just a few examples, planned and made deliveries overnight, quietly and without disturbing residents. This reduced the impact on the road network during the day and had a significant impact on reducing congestion and



freeing up road space in London, which TfL and the Traffic Commissioner are determined to build on and capture post-Games, investigating and trialling more flexible long term delivery patterns, including trials of night time deliveries in London.

In some areas like the City of Westminster efforts to reduce the impact of freight are being directed more towards the roll out of electric delivery vehicles and freight consolidation schemes, such as the one set up by The Crown Estate.

Another legacy for the industry after the Games is the highly-praised Freight Journey Planner – allowing operators to plan the most efficient routes complying with road and loading restrictions.

Customer Experience

The great success of the customer experience strategy saw a step improvement in working together to join up transport for the benefit of customers. A tangible demonstration that superior customer service is valued and that focus and attention on customers enhances reputation, it set the benchmark for customer experience strategies in the future.

The improvements in communication with customers and lessons learned about developing effective information will also have important legacy value.

Volunteering

Volunteers – London 2012 Games Makers, London Ambassadors, TfL's Travel Ambassadors and NR Travel Champions – were one of the great success stories of the Games. Visitors and media from across the world commented on their welcome and knowledge. TfL and transport operators are determined to harness the success of the Travel Ambassadors.

Growth, Regeneration and General Socio-Economic Benefits

It has long been acknowledged that good transport links play a key role in delivering these benefits to an area and the people who live there. The 2012 transport improvements will also make it easier for people to access new jobs. This will support the Mayor of London's convergence agenda which is that, 'Within 20 years the communities who host the 2012 Games will have the same social and economic chances as their neighbours across London.' (GLA, 2012)

Reputational Legacy

The Games were a real boost to UK plc and to London in particular. London has proved that it can plan, build and operate a transport network able to support the most challenging logistical exercise any city can undertake.





What Happens Next?

Undoubtedly, transport worked well in London and the UK throughout the London 2012 Games. Many Games-specific operations, functions and relationships have the potential to carry a legacy value for an improved, integrated and powerful industry force.

It has been announced by Government that a new Olympics Legacy unit has been set up in the Cabinet Office, to deliver a joint Government and GLA programme of work to capture the benefits of the Games for London and the UK. The DfT will be playing a key role in this programme.

A portfolio of bids for future major sporting events in London, some based in Olympic Park venues, building on the 2012 Games and 2017 Athletics Championships, is being developed.

The Games will play a key part in ensuring investment in London's transport network and will secure the London 2012 legacy and the growth of east London. TfL is helping to take this work forward.

A London 2012 transport legacy event was held on 26 October 2012 to start the debate on how the experiences and lessons learned from transport at the Games could be deployed to build on the work done across the UK. The event involved key transport specialists from across the industry who discussed a wide range of issues.

ATOC are progressing an initiative, with TfL, LU, NR and others, to maintain the momentum on collaborative working and the collegiate approach to planning major events in London and the UK. This will consider how integrated planning can be undertaken for major events, and how our cities can become first class venues for national and international events.

The issues to be decided are:

- * How can the collaborative working across the Transport industry continue?
- * How can London continue to improve as a world class venue?
- * Will the TCC be taken forward and in what form?
- * How will Travel Demand Management be driven forward post Games, in London and in the UK?
- * How should the relationships developed be carried forward across the C3 structures including local and/or national Government?
- * How can the industry continue to relate to its customers so well, every day?
- * How can the freight and logistics industries utilise the lessons of the Games going forward?
- * How can we ensure the lessons learnt are shared across the industry, including between local authorities and non Games organisations?
- * How the transport industry can continue to push positive communications?
- * How can the transport industry, along with Government, continue the excellent accessible transport standard experienced throughout the Games?
- * Is there a natural consequence to the success of the Olympic arrangements, and who should carry this forward?

What Worked Well

Working Together

- Collaborative working across all modes, organisations and aligned domains – for example security, city operations, Games operations, aviation and government across the UK – to make transport for the Games a success
- Creation of one transport team four years before the Games, which led to introduction of the Games Transport Board and focussed cross-domain working
- Strong programme, risk, budget and change management across the Olympic transport portfolio
- Integrated approach to accessibility with a clear, pragmatic strategy and execution plan
- Integrated management of parallel events during games time across London and the UK
- Working back across into mainland Northern Europe: ferries, Authorised Ticket Resellers, tunnel operators to manage spectators
- Working with, and de-conflicting, other major infrastructure projects, such as Crossrail, Thames Water and Victoria station upgrades
- Informal engagement of the trade unions
- Provision of Torch Liaison Officers for the Olympic and Paralympic Torch Relays and decentralisation of torch operations to the local authorities

Planning ahead

- Completion of infrastructure investment a year in advance of the Games. This, alongside robust operating plans, means that an exceptionally reliable transport network was operated during the Games
- Establishment of 'Clearway 2012' to manage utilities' work on London's roads ahead of the Games
- Early and thorough testing of the TCC and C3 architecture/co-ordination centres in general

Technical Excellence

- 'One source of truth' in terms of demand forecasting and modelling, providing all parties with a clear understanding of the dimensions and scale of the challenge facing the UK transport network
- Excellent TDM programme, but a greater and earlier emphasis on freight would have simplified the planning process
- Provision of a SJP and associated static transport information on the internet, which ran concurrent with sport ticket sales
- Provision of ticket sales geo-code data allowed almost real-time transport planning refinement
- Heavy investment in coordinated mapping, GIS, a transport extranet and a central source for planning, data and maps
- Accurate, real-time provision of crowd data via Bluetooth

Innovative Thinking

- Introduction of Travel Ambassadors, which allowed operational staff to focus on the task at hand and provided a warm welcome to visitors and Londoners alike
- Building in the flexibility to turn sections of the Games Lanes on or off in response to varying levels of demand

Outstanding customer service

- Heavy maintenance programmes on national rail, London Overground and London Rail brought forward ahead of the Games
- Games Family use of public transport
- Availability of six spare mainline trains was valuable, particularly with late-running football matches and increase in ticket sales
- Session booking of Blue Badge parking
- High use of accessible shuttles, with 100,000 people transported
- High use of cycle parking at out of London venues
- Temporary park-and-rides sites, particularly Eton Dorney, Hadleigh Farm and Weymouth – the sites worked well but were expensive to set up. Recommend using existing black-top wherever possible
- Shuttle bus services from rail stations to venues
- Marshalling of taxis at load zones
- Excellent sustainability record: 60 per cent less carbon, with the remaining 40 per cent offset by BP

What we Would do Differently Given our Time Again

- Launch transport ticketing websites later (three to six months rather than a year before the event would suffice), and with a better understanding of the constraints on promotion as a result of brand and sponsorship arrangements
- Give greater attention to planning transport around road events and ceremonies to try and avoid any conflicting issues
- Develop better forecasts for unticketed spectators and visitors earlier
- Seek clarity earlier on last mile roles and funding
- Start city transport operations earlier, providing adequate resourcing and recognising it will cost significant monies
- Co-locate transport teams to ensure agreement between in-venue and out-of-venue arrangements
- Allocate more time to defining scope, boundaries, costs and funding between the Organising Committee of the Olympic Games and the other transport providers
- Recognise earlier that Olympic football is very different to normal football in terms of crowds, origins and overlays
- Provide direct coaches – while not a best seller, the service was important for social inclusion and contingency purposes
- Give more emphasis on weekend mainline and early morning train services
- Caravans and camping, whilst managed, were less significant than expected

Transport Legacy Electronic Filing Cabinet

Links to key documents and products used to deliver Transport

Publications

- 2012 Learning Legacy
- TfL - The London 2012 Legacy
- GLA – Leaving a transport legacy
- The National Archives
- ODA Transport Team

The Olympic Act

The Olympic Transport Plan

Olympic Transport Plan
PACE – Transport Plan Updates
Consultation Report

Strategies for delivery

- | | |
|---|--------------------------------|
| ODAT 2012 Organisational Design | Accessible Transport Strategy |
| One Team Transport Customer Experience Strategy | Strategic Environmental Report |

Plans and approaches utilised to deliver Transport

- | | |
|--|-------------------------------------|
| Accessible Transport Plan | Master Transport Schedule (summary) |
| Transport Integration Centre Operations Plan | Sustainable Modes Operations Plan |
| Directly Managed Transport Operations Plan | Hub Games Time Operating Model |
| Transport Pulse Check | High Level Project Execution Plan |
| Quality Management System Core Business | Quantitative Risk Assessment |
| Operational Risk Register | |

Key documents and champion products to provide examples of documents utilised to enable transport projects

- | | |
|--|---|
| <p>Capital Projects – Champion Products</p> <ul style="list-style-type: none">Platform 3 RACI MatrixStratford Regional Station Milestone PlanExcel Pontoon Stakeholder MapStratford Upgrade Case StudyExcel Pontoon Bridge DesignMaintenance DashboardsStratford Region Station Upgrade Lessons Learned RegisterStratford Region Station Upgrade Human Factors ReportCoventry Works- Phoenix Way Over bridge additional stairs approval in principle | <p>Customer Experience – Champion Products</p> <ul style="list-style-type: none">Customer Experience Working Group - Terms of referenceCustomer Experience Presentation June 2011Spectator Transport Customer Experience Update Olympic and Paralympics Transport Board Paper 2011-06010 |
| <p>Safety – Champion Products</p> <ul style="list-style-type: none">Safety Readiness CaseHazop Reports Phase 1Hazop Reports Phase 2QRA Safety Report 1QRA Safety Report 2Safety Strategy & Control Plan | <p>Transport Coordination Centre – Champion Products</p> <ul style="list-style-type: none">Concept of OperationsStandard Operating ProceduresDetailed Operating Plan |
| <p>Taxi and Private Hire Guide</p> | <p>Surface Transport – Champion Products</p> <ul style="list-style-type: none">Active Travel ProgrammeWalking and cycling for London 2012Waterborne transport for London 2012Wick Lane planning statementForecasting demand of walking and cyclingForecasting demand of waterborne transport |
| <p>Public Transport - En Route</p> | <p>Operations & Integration – Champion Products</p> <ul style="list-style-type: none">Facilities Matrix |
| <p>Programme Management – Pulse check pre-flight checklist</p> | |

Legacy documents detailing lessons learned

- | | |
|--|---|
| Transport Legacy Report | Olympic Route Network Champion Products |
| Operations and Integration Legacy Report | Junctions and Carriageway |
| Implementation of BS8901 | Third Party Projects |
| Carbon reduction in transport management | Compliance |
| Transport Knowledge Management | Traffic Regulation Orders |
| Transport Knowledge Management Legacy | Testing |
| Transport Planning – Micro Reports | Engagement |
| Public Transport Modelling Overview | Clearway |
| Highways Modelling Overview | Designation |
| Station Modelling | Operations |
| Transport Analytics | ORN Overview |
| Paralympics and Group Travel | Sustainable Transport for Mega Events |
| International Travel | Games Transport Carbon Footprint |
| | Sustainable Modes – Post Games Report |
| | Travel Advice to Business Handbook |

Acronyms

A&D: Arrivals and Departures	LATMP: Local Area Traffic Management And Parking Plans
ATAG: Active Travel Advisory Group	LOCOG: London Organising Committee of the Olympic and Paralympic Games
ATM: Active Traffic Management	NATS: National Air Traffic Service
ATOC: Association of Train Operating Companies	NHS: National Health Service
BAA: British Airports Authority	NR: Network Rail
BOA: British Olympic Association	ODA: Olympic Delivery Authority
BTP: British Transport Police	OPTB: Olympic and Paralympic Transport Board
C3: Command, Control and Co-ordination	OPTIC: Olympic Park Transport Integration Centre
CLZ : Central London Zone	ORN: Olympic Route Network
COBR: Cabinet Office Briefing Room	PRN: Paralympic Route Network
CORNETO: Combined Olympic Route NETwork mOdel	QRA: Quantitative Risk Assessment
DCMS: Department of Culture, Media and Sport	SEA: Strategic Environmental Assessment
DfT: Department for Transport	SJP: Spectator Journey Planner
DLR: Docklands Light Railway	SRO: Senior Responsible Owner
DMTC: Transport Directly Managed Transport Operations Centre	STOG: Senior Transport Officers Group
F&CO: Foreign and Commonwealth Office	TCC: Transport Coordination Centre
GAOTG: Get Ahead of the Games	TDM: Travel Demand Management
GIS: Geospatial Information Systems	TfL: Transport for London
GLA: Greater London Authority	TIC: Transport Integration Centre
GOE: Government Olympic Executive	TKM: Transport Knowledge Management
GTB: Games Transport Board	TOCs: Train Operating Companies
HA: Highways Agency	TROC: Transport Command and Control Centre
HIA: Health Impact Assessment	VMS: Variable Message Signs
ICT: Information Communication Technology	VTM: Venue Transport Management
IOC: International Olympic Committee	VTOPs: Venue-Specific Transport Operations Plans
IPC: International Paralympic Committee	

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