

LMF Site Wide Strategies

February 2009

Introduction

The Legacy Masterplan Framework (LMF), being prepared on behalf of the London Development Agency and its partners, will set out a long term vision and framework to guide development of the Olympic site after 2014.

In the summer of 2009 the LDA will publish the 'LMF End Vision & Ambition'. This document will set out the aspirations for the long-term LMF development, and also set out the likely key steps to achieve the overall vision, including indicative development phasing of the proposals. The LMF will be supported by a number of key delivery strategies and supporting land-use strategies.

The following document outlines the strategies that underpin the preferred framework. The strategies are as follows:

1. **Town Planning Strategy:** sets out the proposed approach to obtain a planning permission for the first phases of development for the Legacy Masterplan Framework. This approach seeks to ensure that planning permission is granted and implemented to meet the shared vision for the area.
2. **Transport Strategy:** sets out how accessibility and connectivity will be improved across the sites, whilst ensuring that there is adequate capacity for the wider transport network to accommodate the movement. The Strategy also encourages the use of sustainable modes of transport and a reduction in car use where possible.
3. **Water Strategy:** sets out how water use will be reduced and sustainable sources used to manage water resources locally.
4. **Waste Strategy:** sets out the way in which waste can be managed and used as a resource to generate energy, through reuse, recycling and recovery.
5. **Infrastructure Strategy:** This sets out the key infrastructure components of the legacy Park which will be inherited from the Olympic Games.
6. **Energy Strategy:** sets out how the low carbon infrastructure created for the Games will be enable the Legacy development to address the Government's zero carbon agenda through new technologies.
7. **Climate Change Adaption Strategy:** sets out what measures should be used to ensure that the LMF minimises its CO2 impacts to become resilient to the future impacts of climate change.

Town Planning Strategy – Executive summary

LMF Planning Application

The LMF proposals are unprecedented in terms of the scale of the site area, the quantum of proposed development and the complexity of the development site. A paramount objective of the LMF is to create a high quality urban environment and a development that can respond to the changing character of the Legacy site over time. To enable this, it will be necessary for the LMF development to be phased over an appropriate timescale. It is expected that the LMF development will take around 25 to 35 years to be fully realised.

An important first step in the delivery of the LMF will be the submission of a planning application in the autumn of 2009, following the publication of the LMF End Vision and Ambition in the summer.

The planning application will seek approval for new homes, employment space, community facilities and related uses and infrastructure where these are expected to be delivered before 2025. This will represent a substantial proportion of the total LMF development. In addition, the planning application will seek approval for a range of 'interim / transitional' uses on those parts of the site where LMF development is expected to be brought forward over a longer timescale. These interim / transitional uses would include a wide range of uses and activities including light industrial and creative workspaces, festivals, temporary event spaces, cultural spaces and activities. These interim uses will put available land to good use, and will also contribute greatly to the creation of an active, welcoming and attractive place within the Olympic Park from 2014 onwards. In this way, it is intended that the planning application will explain how the entire LMF site, broadly comparable to the Olympic Park site, is to be used in Legacy after 2014.

At a later date, expected to be beyond 2025, the land occupied by these interim / transitional uses would be 'recycled' to deliver the development consistent with the overall LMF End Vision and Ambition. Separate planning applications for the long term 'end uses' for the areas identified within the sites as 'interim' areas would be developed within the context of the long term vision outlined within the LMF. The anticipated timing of these further planning applications would be set out in the autumn 2009 planning application.

Policy Context: Olympic Legacy Strategic Planning Guidance

The existing adopted local policy documents of the four Olympic host boroughs covering the LMF site are now dated, and did not take into the account the full implications of London hosting the Olympic Games, or fully consider the impact and potential of subsequent legacy development. The four boroughs within the Lower Lea Valley are at different stages in preparing their statutory Local Development Frameworks (LDF) and all are some way from adoption or developing substantial planning weight.

The Lower Lea Valley Opportunity Area Planning Framework (LLV OAPF), published by the Mayor in 2007, sets out the Mayor's vision and expectations for the LLV generally. Its status as a relevant material planning consideration has been confirmed through recent planning appeals. However, since the LLV OAPF was prepared the proposals for the Olympics have evolved, there has been greater attention to the potential of the areas around the Olympic Park and the understanding of the potential of the Olympic Park site has been developed further.

In order to provide a more up-to-date policy framework to guide development within the Olympic Park area of the Lower Lea Valley, the Greater London Authority (GLA) is leading the preparation of a

planning policy document, the Olympic Legacy Strategic Planning Guidance. This document, which will sit beneath the London Plan, will provide a strategic policy context for the LMF and for surrounding 'Olympic Arc' areas. It is intended that the OLSPG will be sufficiently advanced in late 2009 / early 2010 to provide an up-to-date policy context to inform the determination of the LMF planning application.

The LDA, GLA, the Olympic host boroughs and the London Thames Gateway Development Corporation are working closely together, and with their stakeholders, to ensure that the LMF, together with the OL SPG maximise the regeneration potential of the Olympic area and its contribution to the wider regeneration of East London.

Transport Strategy – Executive summary

Introduction

The legacy of the Olympic and Paralympic Games combined with the further development opportunities will bring major changes to this part of London within the Olympic Park and the neighbouring Lower Lea Valley. The area will become a major generator of people and goods movements for residential, employment, retail and leisure uses. The provision and organisation of transport underpins the wider objectives of the masterplan as the transport strategies must be developed to ensure that economic, environmental and social impacts related to the movement of people and goods are acceptable and sustainable.

The transport strategy for the Olympic Park aims to build on the transport networks developed for the Olympic Games and Transformation stages, by configuring the LMF to make optimal use of the platform created by investment in remediation, roads, utilities, parklands and other infrastructure. It will also benefit from new investment such as Crossrail and other wider London transport initiatives set out within the Mayor's November 2008 publication "*Way to Go! - Planning for Better Transport*".

Capitalising on new investments such as Crossrail, and integrating transport and land-use planning, will ensure the level of car trips is kept to a minimum while also encouraging walking, cycling and public transport to maximise connectivity by sustainable modes.

This summary outlines the key elements of the LMF Transport Strategy and the process through which the strategies for transportation relating to LMF land use scenarios and site design issues have been developed. It focuses on the implementation of in-built mechanisms for the management of future demand and the integration of transportation strategies with the design process in the creation of sustainable, well connected and accessible communities and amenities.

Planning Context

The Olympic, Paralympic and Legacy Transformation Planning applications were approved in September 2007. In addition to the dismantling and reconfiguration of venues and other facilities after the Games, the Legacy Transformation Phase includes the reconfiguration of the road network to form legacy distributor and local roads, cycleways, pedestrian footways and ancillary parking areas.

The other major approved development in the area is the Stratford City Development, which is currently under construction. This development will include significant commercial space of approximately 465,000 sqm, over 4,500 residential units, the creation of major retail and leisure facilities, new schools, and hotel accommodation. Some of the residential units will be used for athletes' accommodation during the Games. When completed, approximately 9,700 car parking spaces are to be provided overall for Stratford City.

The Stratford City development also includes significant investment in improvements to the adjacent highway junctions, improved bus services to serve the development as well as new regional and international bus stations, and enhancements to the regional railway station. New connections from the existing highway network into the Stratford City site, and works to existing highways in the vicinity of the Olympic Park will also be implemented. These highway and bus service improvements will be put in place prior to the Games.

The ODA is committed to provide bus service enhancements in addition to those committed as part of the Stratford City Planning Permission. These bus service improvements were developed in discussions with TfL and will provide excellent potential for high levels of public transport use and cycling and walking, in excess of levels currently achieved in the neighbouring Boroughs. All parts of the Olympic Park will enjoy comprehensive, permeable cycling and walking networks and high levels of public transport accessibility.

Committed Transport Schemes

In addition to the major schemes already being delivered by other organisations, the ODA has committed capital investment to accelerate the delivery of additional schemes considered necessary both for the Games and for London's long term needs.

The CTRL to St Pancras, now known as High Speed 1, opened in 2007 and Stratford International Station is planned to be opened before the Games for both international and domestic services between Kent and central London. These domestic services will dramatically reduce commuting times from Kent to Stratford and Central London. During the Games, the Javelin service will operate between St. Pancras, Stratford International and Ebbsfleet.

Crossrail, which is planned to be delivered by 2018, will run from Maidenhead and Heathrow, through central London, and provide a significant increase in the capacity of the underground network. It will provide a fast service providing a direct link between Stratford, Central London and Heathrow. One branch will serve Stratford and Shenfield, with the other branch serving Isle of Dogs and Abbey Wood. Crossrail will provide increased train capacity on lines into Liverpool Street and Stratford and reduce overcrowding on the Central, Metropolitan and Jubilee lines.

There is a TfL programme of planned enhancements to the Northern, Central and Jubilee Lines and extending the East London Line prior to 2012. By June 2010, the line will run from Dalston Junction in the north to New Cross, Crystal Palace and West Croydon in the south. By February 2011 it will be extended to Highbury & Islington to link with the London Overground service between Richmond and Stratford. More frequent and longer trains will operate between Richmond and Stratford ahead of the Olympic Games. New 4-car electric trains will be introduced from early 2009 and the upgrade of tracks and signaling will be carried out in 2009 and 2010 to enable more frequent services by 2011.

The capacity of the Docklands Light Railway (DLR) will be increased by up to 50% by 2011, with a series of planned improvements. The Stratford International extension will open in 2010 and connect Stratford International with Royal Victoria. Four new stations will be constructed at Stratford International, Stratford High Street, Abbey Road and Star Lane. Existing platforms at Canning Town, West Ham, and Stratford Stations will be upgraded.

An extension of the Bank to King George V line under the Thames to Woolwich Arsenal has recently opened. This links with the existing rail services through Woolwich Arsenal. The Bank to Lewisham line will be upgraded to 3 car trains.

Following the committed strategic transport investment and local transport improvements there will be significant improvements in accessibility both regionally and locally.

LMF Transport Objectives

The high level outcomes of the LMF seek to achieve sociable neighbourhoods that in comparison to current trends have a lower car dependency, that promote healthier and more sustainable modes of transport. Aiming to deliver against London's commitment to a 60% cut in CO2 emissions, requires the development of transport infrastructure that has an inbuilt response to issues of climate change and increased diversity and equality of access.

Taking account of relevant policy and strategy documentation key Transport Objectives have been developed to respond to growth and change, and to address a range of policy advice including health and well-being, and to give certainty with regard to deliverability. By integrating transport and land-use planning (to encourage walking, cycling and public transport) internal and external connectivity by sustainable modes is enhanced whilst also ensuring the level of car trips are kept to a minimum, delivering a sustainable transport system with the key objectives being:

- **To maximise walking**
- **To maximise cycling**

- **To maximise the use of public transport**
- **To maximise the connectivity and accessibility of sustainable modes**
- **To minimise the use of the private car.**

To deliver the transport objectives on-the-ground throughout the site, a set of Guiding Principles for transport to support the LMF have been formulated which define the transportation needs and requirements of the site when moving into the Legacy phase.

- **Adopt a balance of complementary land uses to encourage short trips**, and therefore minimise the need for travel by private vehicle.
- **Develop street and movement hierarchies to maximise accessibility and encourage public transport, walking and cycling trips.** This will help to maximise mode share towards walking, cycling and public transport, i.e. minimise private vehicle trips.
- **Maximise internal and external connectivity/accessibility to and from the LMF area encouraging use of sustainable modes where appropriate.** This will help to ensure that the development meets sustainability targets and also makes sure that the development area is integrated with the surrounding area.
- **Make public transport the option of first choice over private car trips.** This requires that the principles of Travel Planning and the provision of a frequent and accessible public transport network are provided;
- **Encourage healthy living by creating a sustainable transport system.** Through providing a sustainable development and providing real transport choice the LMF should be able to offer healthy and sustainable living to residents, employees and visitors to the site as well as those within the surrounding communities and wider London area.

Outline of the LMF Transport Strategy

To deliver the transport objectives the LMF will build on the improvements to the strategic and local transport networks being delivered by TfL, the ODA, and others up to 2014.

The committed changes to transport infrastructure and facilities within the area will significantly improve accessibility and connectivity to and from the LMF site at both a local and strategic level. In addition to these committed schemes, the principal transport initiatives required to promote delivery of the LMF by 2040 will be:

- Provision of a complementary range of land uses with a good mix of local facilities including shops, leisure and education opportunities that will deliver a high level of local trips;
- Implementation of street and movement hierarchies to maximise accessibility and encourage walking and cycling trips;
- Maximise the number and frequency of connections to the immediate surrounding neighbourhoods (points of access and egress), promoting permeability of the site;
- The comprehensive use of Travel Plans to maximise modal shift to deliver lower-impact and higher quality-of life solutions;
- Provision of a comprehensive pedestrian and cycle network, combining dedicated vehicle-free routes and cycle lanes and pavements to create a wide choice of routes between neighbourhoods and key destinations and interchanges;
- Minimise the need for travel by private car by providing good quality, frequent, accessible public transport throughout the area and promoting the use of car clubs and car share schemes;

- Adopt restrictive parking standards for residents and workplaces, commensurate with discouraging casual car use; and
- Ensure there is high quality, secure and weather protected cycle parking provision for every residential unit, workplace, and public area, and the provision for shower and changing facilities in all workplaces.

LMF Transport Strategy

Overview

The Sustainability Protocol, developed to facilitate the delivery of the LMF, has driven the definition and development of the Transport Strategy.

The overriding transport objectives and supporting guiding principles defined the transportation needs and requirements of the site which would need to be addressed by a number of interlinked strategies to ensure the overarching transport strategy and goals of the LMF can be delivered. To establish deliverable transport outcomes and contribute to the design of the LMF site, individual strategies related to mode, infrastructure requirements and softer measures were formulated, which when combined contribute to the objectives and delivery of the overall Transport Strategy. The interrelated transport strategy topics are:

- Walking and Cycling;
- Public Transport;
- Traffic and Streets;
- Smarter Travel Choices; and
- Waterways

A primary issue for the LMF is to improve accessibility and connectivity to the surrounding areas whilst considering the capacity and ability of the wider transport network to accommodate anticipated movements. To encourage the use of sustainable modes of transport within public areas, the approach to street design adopted within the Manual for Streets (Department for Transport) has been followed where possible, adopting a vision for street design that goes beyond simply accommodating the use of private cars.

Throughout the development of the strategies a high priority has been placed on meeting the needs of pedestrians, cyclists and public transport users, so that growth in these modes is encouraged. At the same time the strategies also place a high emphasis on reducing the need to travel, particularly by the private car.

When the strategies were being developed the following design and operation elements were considered and addressed:

- Linkages and connectivity to the surrounding areas and particularly the fringe locations;
- Consideration was given to the layout and form of the street structure to ensure that walkable, cycle friendly streets could be included alongside a network of pedestrian/cycle only routes and crossing points;
- The provision for cyclists and necessary facilities to compliment high cycle usage was carefully considered, particularly at the transport interchanges;
- The provision of a transit loop system was considered as a component to improve accessibility and the overall connectivity of the site. This had a number of other benefits related to phasing of the site and also opportunities for branding of sustainable modes within the area;
- The opportunities for minimising the need to travel through the introduction of a number of smarter choice travel options. This included a number of components

including bike rental schemes, travel plans (workplace, residential and event/ tourist) and car clubs within the site;

- The issues surrounding car parking provision within the site, and how this needed to be aligned with the sustainable aspirations for the LMF site and the existing precedents and standards in place; and
- The impacts of the developments on highway and public transport capacity. This was predominantly assessed through the use of transport models, both within the site boundary and also on the surrounding local and regional networks.

A summary of the five interrelated strategies follows.

Walking and Cycling

The provision of a complementary range of land uses in close proximity within development areas and across the LMF site will ensure an optimum level of short trips to maximise walking and cycling. These land use planning principles will be supported by a high quality interconnected network of walking and cycling corridors to cater for the anticipated level of pedestrians and cyclists across the site and to encourage these journeys to be undertaken by sustainable means.

Walking routes will link to bus stops around the site ensuring good access to the development areas and external destinations by bus. Movements to and from the site will also be catered for by ensuring the provision of pedestrian connections to public transport interchanges at Stratford and Hackney Wick, as well as key strategic walking routes that cross the site including the Lea Valley Walk and Greenway routes.

Within the Olympic Park, provision for pedestrians and cyclists will be characterised by adequately sized facilities and landscaping features to deliver high quality routes offering a safe and accessible environment for pedestrian and cycle travel. Non-vehicular corridors will consist of appropriate width shared surface routes for pedestrians and cyclists that provide connections through and between delivery zones, and are also leisure routes around the Legacy parkland.

The strategy for pedestrian and cycle linkages will:

- Provide a network of external connections that will fully integrate the park with Stratford City and the surrounding fringe sites;
- Design walking and cycle routes in the LMF site to link with the emerging networks in fringe areas that connect to the LMF network;
- Make use of and improve the quality of existing pedestrian and cycle infrastructure, including sections of the Greenway and Lea Valley Walk;
- Provide pedestrian and cycle links into Leyton and West Ham via the Stratford City eastern access routes;
- Provide western access bridges over the Lea Navigation to complete strong east-west connections across and through the Olympic Park; and
- Deliver high quality cycle / pedestrian only north-south routes to minimise severance of the A12 and Stratford High Street.

The objective is to provide a seamless network of routes to enable movement of pedestrians and cyclists in a safe and direct way around the Olympic Park serving a range of destinations, whilst providing opportunities for leisure trips through the Legacy Parkland and adjacent to the canals.

Public Transport

The provision of fast, reliable and accessible public transport to access the site, from within but also from the surrounding areas is vital to delivering the sustainable aspirations of the site. In relation to rail access, there is a comprehensive network of existing rail facilities that link the Olympic Park to the wider area. Stratford City Regional Station is a major public transport interchange, with London Underground, London Overground and DLR lines facilitating connections throughout London and

beyond. In terms of rail infrastructure proposals, Stratford International Station and the Channel Tunnel Rail Link (CTRL) provide the opportunity to connect the LMF development with continental Europe.

The existing and proposed rail and underground network means that connectivity for the area to the local, regional, national and international destinations will significantly improve. The introduction of Crossrail will not only connect the site directly to Heathrow Airport but will also provide relief to the Central Line, thus improving the local connections.

The improved connectivity across the site for cyclists and pedestrians will provide good connectivity with rail interchanges and the delivery zones of the masterplan. The introduction of activity within the Olympic Park will generate a significant number of rail trips, and consequently a number of walking and cycling trips as people access the stations.

Extensive bus service enhancements are being provided as part of the planning agreements that are in place for the development of the Olympic Park and Stratford City. The LMF will seek to maximise the benefits brought about by the improved services. Consideration has also been given to the infrastructure requirements associated with bus provision, paying particular attention to the possible provision of bus priority measures to ensure journey time reliability can be maintained within the development.

To provide a catalyst for development, the LMF is proposing a bus transit loop that circulates the Park, linking interchange points with the delivery zones and venues within the park. This will deliver local connectivity within and across the site but would also inter-link with the existing and planned public transport routes accessing the area. The transit loop would provide a link to the interchange stations around the site including Stratford International, Stratford Regional, Hackney Wick and Pudding Mill Lane. The delivery and operation of the transit loop is to be progressed with London Buses and private operators.

Bus stop locations have also been considered including their spatial requirements and positioning within the streetscape to ensure that the people using bus services to access the facilities on the site can do so within acceptable travel times. As guidance, all developments are intended to be within 400m of a bus stop.

Traffic and Streets

The sustainable aspirations for the LMF development, means that cars, although needed within the site, will not be considered as a primary mode of transport. It is recognised that developments within the site will require access by car but when consideration is given to the design of street infrastructure around the site, they will not take priority over other modes.

A comprehensive travel demand strategy has been developed, supported by a range of other measures that will minimise the use and impact of private car use around the site. This seeks to ensure that car-borne traffic generated by the site is effectively managed. This needs to be done to ensure that the site is a safe and enjoyable place to be but also to ensure that the use of sustainable transport modes contributes to the carbon reduction targets for the LMF.

The general philosophy for the street structure for the LMF is to create a user hierarchy that is designed to consider the needs of sustainable transport users ahead of the car.

The requirement to facilitate vehicle access means that a core network of 30 mph distributor routes has been defined for the LMF site. These routes will be all purpose, providing access for all modes but with a formal carriageway arrangement. The distributor network will be characterised by convenient direct routes and could carry significant volumes of traffic across the Olympic Park.

Local access routes will connect the distributor routes with the development areas. These will likely be in the form of all purpose streets, incorporating traffic calming measures to help keep speeds at 20mph. At or below this speed, the volume and severity of injury accidents is greatly reduced particularly for severe or fatal occurrences.

Development routes will generally provide access through development areas. These will provide calm traffic environments with shared surface streets and squares. These streets will encourage low vehicle speeds and create an environment in which pedestrians can move around without feeling intimidated by motor traffic. The absence of a formal carriageway and surface treatment of streets will cause motorists entering the area to drive more cautiously and give priority to pedestrians and cyclists, ensuring an active streetscape and vehicle speeds well below 20mph.

One of the strategies which impacts on transport choice is the availability of parking. It is considered that car parking restraint, below maximum parking standards, will be required to reduce the use and impact of private car trips. A comprehensive site-wide car parking strategy is to be developed which will support minimal use of the private car. It is anticipated there will be variable levels of parking across the site and the Public Transport Accessibility Levels (PTALs) will be used to inform parking standards. The car parking strategy will also need to recognise the needs and operations of the retained venues, both during the day to day operations and when events occur.

High density development will be concentrated in areas where there are high PTALs to maximise sustainable travel and accessibility benefits, such as along public transport corridors, and around major interchanges such as the Stratford Stations. In these areas of the Park there should be a high level of car parking restraint, and measures could include high daily parking charges and a low provision of parking.

Higher levels of parking may be permitted in more peripheral areas with both lower development densities and PTALs, such as in the western half of the site which is further from the major public transport hubs. However, there will need to be some level of parking restraint across all areas of the Park to ensure that the effects of on street parking and vehicular access do not detract from the high quality streetscape environment and public realm.

Smarter Choices

The proposed smarter choices and demand management strategies contain a wide range of measures and initiatives which aim to reduce the negative impacts of travel on congestion, carbon emissions, the environment and health. Measures and initiatives to reduce the dependency on single occupancy car use and encourage sustainable modal choice, have been evolving for many years in various forms, more recently being termed Smarter Choices by the Department for Transport (DfT) in their July 2005 report entitled 'Smarter Choices – Changing the way we travel'. These measures and initiatives have the potential to play a leading role in ensuring that the potential large numbers of people travelling to, from and around the LMF area, as residents, employees and for recreational needs are able to do so with relative ease by a variety of sustainable modal choices.

Travel Plans would be developed from the Framework identified in the approved planning application for the Olympic Legacy Transformation phase. This would set out the overall strategy for managing travel in the LMF and would provide a framework for schools, employers, venues and residential developments to prepare and implement their site specific travel plans;

The range of smarter choice initiatives to be developed could include:

- A Mobility Management Centre, to offer the public a complete travel information service;
- Personalised Travel Planning (PTP) is a targeted marketing technique that delivers information, incentives and motivation to induce voluntary travel behaviour change;
- Community Bike Schemes provide a street based rental service that allows people to hire and return bicycles; and
- Car Clubs give members quick and easy access to a car for short term hire.

Smarter choices measures focus on changing people's travel behaviour by removing the barriers to and increasing the benefits of travelling sustainably. The smarter choices measures are combined with hard traffic restraint measures to ensure the benefits of reduced traffic are locked-in. Without this, the road space freed up by the smarter choices programme could simply attract more car use by other people.

Waterways

The location of the LMF presents a number of opportunities to use the existing waterways in the area to move people, freight and waste. A significant amount of work is being done for the Olympics to make the canals and rivers running through the Olympic Park navigable. The River Lea through the Lower Lea Valley, to the Thames, is unlikely to be an option for the mass movement of people, but could relieve some of the pressure on the modes of transport to the site and still presents an attractive option to tourists and leisure visitors to the park and its facilities.

For freight navigation the head of navigation on the River Lea is likely to be at the existing bridges at Carpenters Road and the railway line as these both have fairly low clearance. However, there are clear opportunities for a navigable route through to the Thames for the movement of freight and waste, to and from the site in a sustainable way, which will need to be explored further. Leisure navigation will still be possible upstream of Carpenters Road.

The strategy is to ensure navigable routes and connections with the River Thames and operational wharves to maximise opportunities for water travel across the region, utilising the existing network of waterways running through the Olympic Park for leisure and freight movements where feasible. This will require:

- Navigable waterways to support the movement of freight and leisure boats;
- Development of marinas to maximise opportunities for leisure and freight interchange and to promote the LMF site as a leisure destination; and
- Ensure connections with wharf interchange points on the River Thames to facilitate interchange with larger vessels for exchange of goods / passengers.

Summary

The transport strategy for the LMF aims to build on the transport networks developed for the Olympic Games and Transformation stages. This will make optimal use of the investment in public transport, roads, parklands and other infrastructure.

The Transport Strategies have been developed based on the guiding principles to improve accessibility and connectivity to the park and surrounding areas whilst ensuring the capacity and ability of the wider transport network to accommodate the anticipated movements.

Throughout the development of the strategies a high priority has been placed on meeting the needs of pedestrians, cyclists and public transport users, so that growth in these modes is encouraged. At the same time the strategies also emphasise the need to reduce travel particularly by the private car.

The implementation of the transport strategies will ensure that the LMF transport objectives will be delivered and the vision for a sustainable transport system for the site and linking with the surrounding area can be achieved.

Water Strategy – Executive summary

Overview

With the effects of climate change and population growth now evident, water is becoming an increasingly valuable commodity. This is particularly relevant in London where demand is high and water is already over abstracted.

In Legacy it will be essential that water resources are managed in a sustainable and holistic manner in order to maximise the opportunities for water recycling and to minimise mains potable water demand.

The Water Strategy, which builds heavily on the on the Olympic Sustainable Development Strategy and the targets contained within it, sets out the key Legacy proposals for:

- Water Resource Management (WRM);
- Flood Risk Management (FRM); and
- Surface and foul water drainage.

Water resource management proposals will be inherent within the Masterplan at all levels, from swales in the landscape to site wide networks. The LMF will provide a flexible framework for delivering against challenging targets.

The flood defence infrastructure delivered for the Olympics provides a robust platform for Legacy development to take place. Development undertaken through the LMF must therefore respect existing flood mechanisms and respond to any new challenges.

A range of opportunities exist for applying sustainable urban drainage principles and recycling foul water.

Proposed Water Strategy

In terms of **water resource management** the following Strategy is proposed:

- Demand reduction measures such as water efficient fixtures and fittings should be used as standard in buildings;
- Quality of supply should be matched with quality of demand, and potable water should be substituted by non-potable water wherever possible;
- Subject to a sustainable source being secured, non-potable water supplies should be delivered to all new residential developments enabling residential developments to meet the highest potable water reduction standards. Consideration should be given to serving commercial development with non-potable water;
- Only non-potable water should be used for irrigation;
- Local rainwater harvesting, grey water recycling and black water treatment opportunities should be encouraged for all developments;
- Localised river water abstraction should continue to be considered for local irrigation subject to consultation with the EA and British Waterways;
- Ground water abstraction should be minimised unless evaluated to be truly sustainable;
- Use of surplus CTRL box water should be explored;
- Sustainable drainage systems should be integrated with water resource management schemes; and

- A site wide black water recycling plant should be explored, possibly located near to the foul water pumping station at the southern end of the site. This could potentially connect into a non-potable water network.

In terms of **flood risk management** the following Strategy is proposed:

- New developments must comply with PPS 25 and must not result in increased flood risk either on or off site;
- A strategic flood risk assessment should be prepared in support of the LMF planning application;
- Future development must not impact on the overland flood route. Likewise, it will be necessary to ensure that permanent flood mitigation measures built for the Olympics are not compromised; and
- The core Olympic Park has been designed through the Olympics Project to withstand a 1:100 year flood event including allowance for climate change. However attention is required to the Pudding Mill Lane area, where flood defence upgrades may be required.

In terms of **surface and foul water drainage** the following strategy is proposed:

- The LMF should maximise use of Olympic surface and foul water drainage infrastructure, with new local networks serving development plots. This infrastructure has generally been sized to accommodate the Legacy condition;
- The surface water drainage network should be designed in accordance with PPS 25;
- Sustainable drainage systems should be used wherever possible for pollution prevention and source control;
- Due to low ground permeability and contamination constraints, the principal SUDS to be used in Legacy are likely to be permeable paving, swales and green and brown roofs; and
- Opportunities for grey and black water recycling should be explored in conjunction with the development plot designs.

Stakeholder consultation will be important in the ongoing development of the Water Strategy. A number of stakeholders will be consulted through the planning process including the Environment Agency (EA), Thames Water (TW), British Waterways (BW) and the London Host Boroughs.

A flexible and adaptable approach will be essential to delivering the long-term, phased build of the LMF. This Strategy should become an evolving, working document as the development responds to changing economic, political and environmental circumstances.

Waste Strategy – Executive summary

Introduction

As the protection of the environment and the phenomenon of climate change become increasingly acknowledged there is now a clear move towards regarding wastes not as a problem, but as an opportunity and potential resource. The waste strategy for the LMF will build on this approach, ensuring that every opportunity is taken to effectively manage the wastes that are likely to be generated.

This executive summary briefly describes the development of the waste management strategy for the LMF, discussing the current situation and constraints, and analysing and testing various options for the collection and transfer of wastes. It summarises by presenting a preferred outline waste strategy and the options for overarching responsibility for waste management.

Estimated Waste Quantities

Arisings of household wastes from the site have been estimated from a wealth of information on typical arisings, an assumption of 2.5% year-on-year increases and from the numbers of residences. The estimated arisings are as follows:

Olympic Legacy			
Estimated household waste arisings (tonnes)			
	Baseline	Higher variant	Lower variant
Co-mingled recyclables	8,766	10,432	7,035
Food wastes	3,430	3,876	3,430
Residual wastes	1,733	1,750	901

These figures represent waste arisings for the LMF area at full development rounded to the nearest tonne and are based on the latest available development figures and typical waste composition from 2004. At present, waste arisings in the UK continue to increase by approximately 2.5% per annum. However, taking into account the direction of the waste industry and waste legislation, it seems unlikely that this trend will continue for long.

Commercial and industrial waste arisings are more difficult to predict. Unlike for municipal waste, typical waste arisings information is not available and, at this stage of the LMF development, the type, nature and scale of businesses is still subject to agreement. Consequently planning for them is not incorporated in the LMF waste strategy. Clearly some of those wastes likely to arise may be suitable for incorporating into the various strategies proposed for household wastes but this has not yet been considered in detail.

Waste Management

The current waste management arrangements for the authorities in whose areas the LMF is located mostly rely on road based collection of wastes, with a variety of approaches adopted for the various waste streams being managed. Key existing and planned waste management facilities have been mapped to give a clear picture of current infrastructure.

A five step process has been adopted to consider the management of wastes:

- **Storage** - both individual households and communally prior to collection;
- **Collection** - from the place of production/storage to a central location;
- **Transfer** - of collected wastes delivered to the central location for further processing or treatment;

- **Treatment** – for example sorting at a material recovery facility, gasification, anaerobic digestion etc; and
- **Final disposal** – of non-recyclable elements of the waste streams to landfill.

In relation to the LMF the following key issues have been considered for each of the above:

- **Storage.** The requirement for the storage of wastes in households should be minimised by encouraging residents to deposit waste little and often in communal facilities located on the ground floor of buildings or externally.
- **Collection.** Three broad waste collection technologies have been considered: food waste disposers, vacuum collection, and road based collection. These collection technologies have been modelled in order to assess their merits. It was concluded that in terms of carbon emissions, road transport would be the preferred method of collection for these waste streams, delivering the wastes to a central facility for further treatment. However this conclusion still needs to be considered versus other advantages of vacuum systems such as creating cleaner and more streamlined streetscapes. FWDs were non-preferred by the Water Authority.
- **Transfer.** There are no specific proposals for waste transfer at this stage. However, options are being explored including the enhancement of the Energy Centre at Kings Yard and use of off-site facilities which could serve a wider strategic function.
- **Treatment.** The proposed strategy envisages mixed recyclables and residual wastes including food wastes being delivered to a central waste facility. It is envisaged that mixed recyclables would be processed through a Materials Recovery Facility with onward transfer to the recyclables materials markets. Options are being explored to residual waste including the enhancement of the Energy Centre at Kings Yard and a number of off-site opportunities for waste treatment facilities, which could potentially serve a wider strategic function, are being explored.
- **Final Disposal.** Irrespective of the treatment methods adopted there will inevitably be a certain amount of wastes requiring to be disposed of to landfill. This could include raw wastes when the treatment plants are out of commission because of breakdowns, wastes that cannot be processed for whatever reason and ash from the gasification process. These wastes will probably need to go to landfill although it outside the scope of the LMF to identify a particular landfill facility. Transfer of these wastes by water would be the preferred option.

Proposed Waste Strategy

The proposed waste strategy established to date is as follows:

- Wastes should be dealt with in two streams: mixed recyclables and residual wastes including food waste;
- Minimal waste storage should be provided in residential developments;
- Centralised waste storage should be provided for residential developments based in conventional wheeled bins stored underground;
- Co-mingled recyclables and residual wastes including food wastes, should be collected by road based systems and delivered to a central waste facility as close as possible to the LMF area (site to be determined);
- Maximum recovery of recyclables should be made through materials recovery facilities located at the central waste facility;

- Recovered recyclables should be processed into finished goods as close as possible to the central waste facility;
- Energy should be recovered from residual wastes and food wastes through novel thermal treatment such as gasification. This will produce syngas which should be piped into the Energy Centre at King's Yard as fuel for the CHP Plant;
- Final disposal of bypass wastes from waste facilities, raw wastes during unplanned shutdowns of treatment facilities and ash from thermal treatment processes should be disposed of to landfill; and
- Any onward transfer of wastes, or recyclables from the central waste facility for further treatment or disposal should be undertaken by water based transport wherever possible.

It is important to recognise that phasing of the LMF build out will have a significant impact on waste management. It will require the consideration of various interim arrangements whilst the waste streams build up to viable quantities for the final strategy to be pursued.

In addition the LMF development straddles four existing local authority boundaries, which necessitates particularly careful planning and co-ordination in terms of waste management infrastructure. It is understood that the current thinking in the relevant organisations is to form a dedicated authority to manage waste, and possibly other responsibilities, across the LMF area. However further discussion and consultation is required on this.

Crucially, the LMF waste strategy must be flexible. It should be a working document that is able to evolve over time in response to changes in the recycling industry, phasing of development, stakeholder interests, technological advances and the economy.

Infrastructure Strategy – Executive summary

Perhaps the most important long term Legacy investment of The London 2012 Olympic and Paralympic Games is the extraordinary scale of new infrastructure built in this part of east London. The wealth of new infrastructure includes:

- 10 km of roads;
- 14 vehicular bridges;
- 11 footbridges;
- 12 km of primary utilities corridors including heating, water, electricity and telecoms;
- 12 km of primary surface water drainage pipework; and
- 2 km of deep primary foul sewer.

The landform will be cleaned up and reshaped for Games leaving essentially level platforms for development connected by an extensive network of fully accessible roads and bridges. The new Combined Cooling, Heating and Power (CCHP) Energy Centre located at King's Yard will deliver sustainable power and heating to the Park, as well as cooling to the Hackney Wick East area. Deep underground tunnels will convey foul water to the Northern Outfall sewer in the south and carry major electrical cabling, removing the need for overhead power lines. Through the new surface water drainage network and new or upgraded river edge structures, development sites will be protected from flooding up to a flood event of 1 in 100 years including consideration of climate change.

The scale of this new infrastructure is unprecedented in London. It will enable development to commence immediately after the Games, with plots already serviced by roads and utilities built to accommodate the Legacy condition.

The Games infrastructure has generally been designed to accommodate an assumed Legacy condition based on land use and development density in accordance with the Opportunity Area Planning Framework (OAPF). In addition twenty five percent extra capacity has been allowed.

In order to transition from the temporary Games set-up to a living, working part of London, inevitably some additional infrastructure will be required in Legacy. Development plots will need local utilities and road networks, and river edges may need to be upgraded if building is to take place close by. Local alterations to the road network will be required to deliver a sustainable and fully integrated transport system. Some additional bridges are proposed to improve connectivity for pedestrians and cyclists. Further remediation will be required wherever basements and deep utilities are installed, so this will be minimised where possible.

Utilities will generally have sufficient capacity to support the early phases of development, although upgrades may be needed in some areas if development significantly increases above the original forecasts set out in the OAPF. For much higher development densities, electricity and water supplies may need to be upgraded from the primary utilities network. It is envisaged that additional heating and cooling could be managed within the development plots, through provision of thermal storage and local chillers. Foul and surface water drainage networks are unlikely to need any upgrades although new connection points and outfalls could be required.

In terms of infrastructure, key considerations for the LMF are as follows:

- **Sustainability.** A key sustainability driver of the LMF is to maximise use of the inherited Games infrastructure, thus capitalising on the investment to date and minimising waste.
- **Recycling.** Where transformation works between the Games and Legacy are required a key objective is to recycle materials and temporary applications into the permanent Legacy design. This could include temporary road and hardstanding materials, bridges and the Games overlay.
- **Integrated design.** The successful integration of engineering infrastructure with the rest of the streetscape will be crucial. Roads and streets must of course be functional and fit for

purpose but moreover be attractive and safe places to all users, with footways, cycleways, trees, SUDS systems, public art and the landscape all considerably integrated.

- **Logistics.** Where new infrastructure is required for Legacy an overarching principle is for such infrastructure to be delivered at a point in the programme that maximises immediate benefit and minimises risk of future disruption / operational impact.
- **Flexibility.** Given that the LMF is a parameters based framework which will change and evolve over the long term build out of the site, maintaining flexibility to accommodate future infrastructure and technological developments will be critical. Principally this requires sufficient space allowance for new infrastructure to be installed in the future with minimal disruption to the urban fabric.

Consideration of the above has been inherent within the LMF design process to date, and initial technical analysis has been carried out to determine the extent of infrastructure works required to support both the initial LMF phases and final build out. This analysis has been incorporated into the Output C Masterplan and associated business development plans.

Energy Strategy – Executive summary

Introduction

The energy infrastructure that will be installed for the 2012 Games is already planned to deliver a 50% reduction in total CO₂ emissions for built elements compared with buildings built to 2006 Building Regulations. This is planned to be achieved by: high energy efficiency standards for the completed venues; a high efficiency district heating and cooling network served by Combined Cooling, Heating and Power (CCHP); a 3MW biomass boiler; a 2MW wind turbine; and through a variety of smaller scale renewable energy technologies integrated into buildings and the park. The CHP engines located in the King's Yard energy centre will initially operate on natural gas but have the potential to be converted to run on syngas derived from biomass or from the non-recyclable biomass component of municipal or commercial waste.

The LMF aims to build on the substantial investment that has already been made in this infrastructure and to bring about further reductions in CO₂ emission for legacy that will help deliver the Government's and London's CO₂ emission reduction targets.

A Low/Zero Carbon Energy Strategy for LMF

Key objectives for the LMF energy strategy have been to:

- reduce design-related energy demands for all end uses;
- use sustainable low carbon and renewable energy sources;
- encourage low carbon patterns of use by occupiers;
- make the best use of the energy infrastructure inherited from Games use;
- ensure compliance with current policy;
- provide the flexibility for legacy development to meet the Government's zero carbon policy commitments however they are finally defined;
- facilitate the delivery of a wider strategic decentralised energy infrastructure for the east of London;
- explore an integrated approach to the management of waste and energy supply;
- ensure affordable and competitive running costs for occupiers; and
- ensure proposals are deliverable and affordable.

The key elements of the **Preferred Energy Strategy** are set out below:

Reducing Energy Demands

- Encouraging highly efficient well day-lit homes with energy efficient lighting, high levels of insulation, air-tight construction and heat recovery systems that deliver a Heat Loss Parameter no greater than 0.8W/m²K.
- Promoting narrow plan buildings to maximise daylighting that are appropriately orientated and shaded to reduce cooling demands, which employ efficient lighting, ventilation, heating and cooling systems and that are capable of maintaining comfortable conditions in a warming climate.
- Requiring development partners to provide simple feedback to occupants on the real time rate of energy use in their homes.

Decentralised Low Carbon and Renewable Energy

- Working with the King's Yard energy centre concessionaire to identify options for converting the King's Yard Combined Heat and Power (CHP) gas reciprocating engines to run on biomass derived syngas and using these to supply close to zero carbon heating and power to all new development and retained games venues using the district heating network installed for the games.
- Encouraging and facilitating the production of syngas at appropriate industrial sites close to the LMF so that this can be piped to the CHP engines installed in Kings Yard under a contract with the energy centre concessionaire.
- Providing zero carbon electricity from the 2MW wind turbine being installed at Eton Manor for the games and exploring the delivery of a second turbine on an appropriate site.
- Retaining and using any small or medium scale renewables integrated into the venues or the parkland as part of the Games (for example any PV installations).

- Allowing flexibility for additional building integrated renewables to be installed by developers, taking advantage of grant mechanisms and fiscal incentives that may be available at the time of development – e.g. future feed in tariffs for PV.
- Providing the ability to extend the proposed district heating network beyond the LMF site boundaries to link with networks serving neighbouring development and wider networks planned for the east of London. This will enable the future import and export of low carbon heat.

Monitoring and Feedback

- Encouraging facilities to enable ongoing monitoring, feedback and reporting on energy demand and CO₂ emissions.

Provided that sufficient syngas can be produced from entirely renewable source material and the quality and availability of this gas meets the requirements of the energy centre concessionaire, this strategy will enable all legacy development to be zero carbon meeting the Government's zero carbon policy agenda. It should also allow a sustainable route for the disposal of London's non-recyclable waste .

Challenges Ahead

Delivery of the preferred strategy will be challenging:

- Few built examples exist of syngas fuelled reciprocating gas CHP engines serving major developments and none are at this scale. This introduces the additional risks and commercial barriers associated with any ambitious project or technology of this kind.
- A range of external stakeholders will be required to support and facilitate the delivery of this preferred strategy as some elements lie outside the direct control of LDA and the LMF team.
- The timeframes for bringing forward a planning application for any offsite anaerobic digestion or gasification facilities and for preparing the LMF may not align.
- There are a limited number of industrial sites close to King's Yard that would be appropriate for a facility producing syngas. Further work is required to better understand the volume of gas that could be generated from these sites.
- Any new facilities for the production of syngas will need to address the detailed planning requirements associated with such a facility. The operators will need to have a robust commercial model with an identifiable long term feedstock and use a technology that can attract financial investment.
- Delivery of the strategy is dependent on identifying a technical solution and commercial arrangement for the supply of syngas that is acceptable to the current energy centre concessionaire.

Recognising these challenges, the preferred strategy offers a highly sustainable solution that delivers substantial cuts in carbon emissions while helping address London's waste management issues. It is also anticipated to offer a relatively low cost route to enabling future development to meet the zero carbon standards expected to be in place from 2016. The availability of serviced development plots with a source of zero carbon heat and power should provide an attractive incentive for those seeking to develop or locate within the LMF boundary.

The preferred strategy does not prevent alternative or additional building integrated solutions or offsetting arrangements being adopted should future Government incentives make them attractive or if technical and commercial challenges limit the use of syngas.

The LMF team will be engaging with stakeholders to gain their views on this strategy and assuming these are positive, to engage with them and the energy centre concessionaire in securing its delivery. While we have set out a preferred option based on what is known now, legacy development will occur over a long time frame and the policies and incentives introduced to address climate change are likely to develop significantly over that period. It is essential for the LMF to provide a flexible framework that allows a range of carbon saving options to be brought forward in response to changing regulatory and market pressures. How best to achieve this will be a key focus of the work up to a formal planning application later this year. The Government is expected to consult on a range of relevant initiatives over this period, including the future direction of Building Regulations and proposals for the definition of zero carbon for non-domestic buildings. The preferred strategy will continue to be reviewed in relation to key policy announcements and further technical studies.

Climate Change Strategy – Executive summary

Introduction

The imperative for adapting to the impacts of climate change is significant. Summers will get hotter and dryer, winters warmer and wetter and weather patterns more unpredictable. In London these consequences are already being felt.

The LMF offers the potential to be an exemplar in climate responsive design.

The London Plan includes a suite of policies requiring action to adapt to climate change, including:

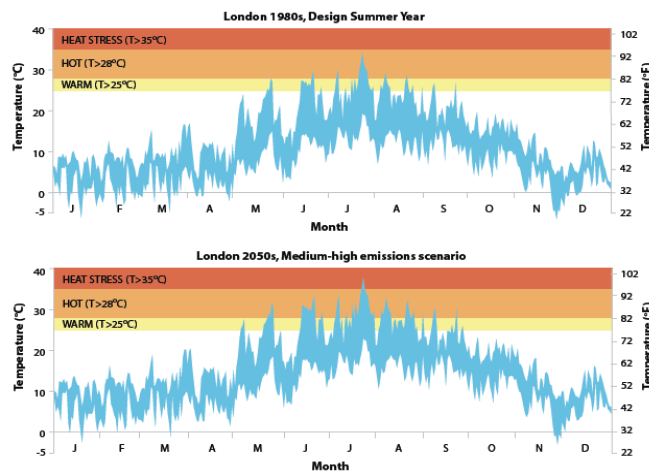
- Minimising the contribution of development to the urban heat island; and
- Incorporating living roofs and walls.

The LMF Climate Change Adaptation (CCA) strategy promotes development that responds to London Plan policy, does not contribute to the urban heat island and provides comfort for residents and users in both internal and external environments.

Critical thresholds

Adaptive capacity in terms of high temperatures and to some extent flooding will be created by maximising permeable areas wherever practicable. This can be achieved by a combination of green spaces, green roofs, and cool permeable surfaces. Other measures such as living and fixed shading will seek to keep internal temperatures within thermal discomfort thresholds (see graph).

The outcome should be spaces and buildings that are able to respond to projected changes in climate with minimal reliance on energy intensive mechanical cooling.



Climate Change Adaptation Options

The following broad options have been considered across the site:

- **Trees and shading.** Large deciduous trees help to manage high temperatures and should be focussed on all roads and thoroughfares. Where trees are not possible then shade should be provided using living structures or louvers on buildings.
- **Cool and permeable paving.** This helps to manage high temperatures and reduce flood risk. This should be considered on all hard surfaces except heavily trafficked roads.
- **Green walls and structures.** Plants can grow directly on or into walls or as part of a separate structure, such as a trellis. Ideally suited to public spaces and places where trees are not feasible.
- **Green roofs and green spaces.** These help to manage high temperatures, reduce the risk of flooding and provide amenity space. All roof space should include semi-intensive or intensive green roofs where possible.

Green infrastructure must be well irrigated for it to maintain its cooling effect. Different options will be more or less suited to different parts of the LMF site. Planting regimes will have to consider future climates and the impact on infrastructure and utilities.

Proposed Climate Change Adaptation Strategy

The Climate Change Adaptation Strategy for the LMF proposes that the following measures should be adopted wherever possible:

- Large canopy deciduous trees with occasional use of evergreens to provide improved shelter from winter wind;
- Green walls and trellises where trees are not suitable or possible;
- Green roofs. Ideally these should be semi-intensive or intensive. Roofs around and between perimeter blocks could be linked using bridges. This will help to create wildlife corridors and larger amenity spaces;
- Sustainable urban drainage systems incorporated into the street layout, including permeable paving across all suitable hard surfaces;
- Buildings should preferably be narrow plan, double aspect and be orientated north-south since this makes it easier to keep buildings cool;
- Mechanical cooling minimised. Where mechanical cooling is unavoidable, waste heat vents should be located above the roof line to avoid contributing further to the urban heat island;
- Bedrooms should preferably be located away from heavily trafficked roads. This will enable windows to be kept open and reduce the need for mechanical cooling;
- Fixed shading, such as louvers, should be provided on the outside of buildings;
- Opportunities should be sought to create small green spaces within built up areas to promote localised cooling effects. These could be combined with sustainable drainage; and
- All development sites to be protected against flooding based on a 1 in 100 year flood event including allowance for the effects of climate change.

Subject to further agreement, it is envisaged that these measures will be brought forward through the LMF planning applications and development briefs.