## The Docklands Light Railway (Dagenham Dock Extension)
### Order Transport and Works Act 1992

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**MAYOR OF LONDON**

**Transport for London**
Non-technical Summary of the Environmental Statement

Transport and Works Act 1992

DOCKLANDS LIGHT RAILWAY (DAGENHAM DOCK EXTENSION) ORDER
The Environmental Statement

The Environmental Statement and this Non-technical Summary have been prepared by Temple Group. Temple Group is an independent environmental and planning consultancy with extensive experience of undertaking environmental impact assessments of transport infrastructure schemes.

Copies of the Environmental Statement and other application documents are available for inspection at the locations listed on the back cover of this document.
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Docklands Light Railway Ltd (DLRL, part of Transport for London) is proposing to extend its existing DLR service eastwards to Dagenham Dock. The route will take the DLR through an area earmarked for development as part of the wider regeneration of East London’s riverside. The area is steeped in a history of heavy industry and power generation that has left a legacy of contamination and environmental decline. But equally there are numerous important and sensitive environmental features that need to be safeguarded, associated in particular with the Thames and its tributaries. So the DLR extension (the scheme) is faced with the challenge both of protecting the resources that remain in the area and of bringing about, directly and indirectly, environmental enhancements that can be enjoyed by this generation and the next.

Consideration of environmental constraints and opportunities has been fundamental in the scheme’s development. The alignment that is now proposed reflects this in the way that it avoids or minimises undesirable effects and exploits opportunities for environmental improvements.

An assessment of the environmental changes, both good and bad, that are likely to result from the scheme (termed an EIA or environmental impact assessment) has culminated in an environmental report, which this document summarises. The environment will remain a key consideration as the scheme design is developed further, as construction commences and as the new DLR service begins operation.
2 Reasons for the scheme

The DLR line to Beckton opened in 1994 and has since had a key part in the regeneration of the Royal Docks area. With extensive plans for continued development eastwards, beyond Beckton and through Barking Riverside, DLR is seen as having a vital role in unlocking the potential of these areas by linking them with the Royal Docks, Canary Wharf and the heart of London.

Barking Riverside will form a new community along two kilometres of the River Thames waterfront. It will provide a home to more than 26,000 people and jobs for 1,500, as well as offering new schools, shops and extensive areas of open space and parkland. The DLR scheme is essential to help Barking Riverside fulfill its potential by opening up access to the development and making it much easier to get to and from it without having to use a car.

As well as fulfilling these specific objectives, the scheme reflects the Mayor of London’s desire “to create a world class transport system that enhances business efficiency, ensures a wider spread of the fruits of economic prosperity and improves the quality of life of every Londoner.”

The scheme reflects the Mayor of London’s desire to create a world class transport system that improves the quality of life of every Londoner.
3 Scheme description

The route

The route extends between the existing DLR station at Gallions Reach in the west and a planned new DLR station at Dagenham Dock in the east. From Gallions Reach the lines split from the existing DLR route descending to pass south of the existing DLR depot. The area south of this is currently undergoing substantial redevelopment as part of the Albert Basin scheme and new houses will be located in this area by the time construction of DLR starts. Connections with the depot will be provided along with a new depot siding. The lines enter tunnels between the industrial warehouses of the Gemini Business Park. To avoid the need for a level crossing, Armada Way will be rerouted over the DLR tunnels. The area west of the business park is largely open land, but is the subject of a planning application. The proposed Beckton Riverside development would be mixed use, including houses, and if permission is granted it is expected to be complete by 2016, prior to completion of the DLR. The tunnels pass beneath the Beckton sewage works and then turn south to avoid any possible structures that might be built by Thames Water as part of its Thames Tideway project. The tunnels turn north again and start to rise as they pass beneath the mouth of the River Roding. They continue beneath the riverside wharfs, rising to the surface at DePass wharf.

Two intervention shafts will be required for emergency access to the tunnels, one in the west in the Gemini Business Park and the second at the southern end of Creekmouth open space. Both require small surface buildings and an area for emergency vehicles to stop and turn in. The eastern intervention shaft has been designed to avoid landtake from the Creekmouth open space. The lines rise through cutting and enter Barking Riverside where they pass onto viaduct. This area has planning permission, mostly for housing, and will be developed over four phases, lasting some 25 years (see below). With construction of the DLR scheme starting in 2013 and services commencing in 2017, it is inevitable there will be some overlap in construction between the two projects. The lines bear north, still on viaduct, over the former Renwick Road landfill and beneath the electricity transmission lines that will remain. This area, north of Choats Road, will be devoted in the future to open park land under the Barking Riverside scheme. Having passed over the Ship and Shovel channel the lines go from viaduct onto a new bridge, which carries them over the Channel Tunnel Rail Link (CTRL) tunnel and other rail lines. The DLR route descends to run along the north side of the rail corridor and reaches ground level east of Choats Manor Way where it requires a short diversion of the Gores Brook. It reaches its terminus at Dagenham Dock station.
New stations

Five new stations will be developed along the route:

- **Beckton Riverside** to the east of the DLR depot
- **Creekmouth, Barking Riverside** and **Goresbrook** stations, all within Barking Riverside and
- **Dagenham Dock**, north of the existing railway alongside the existing mainline station.

The new DLR service

The scheme will link with the rest of the DLR network, with services running in each direction every six minutes during rush hours and every ten minutes at other times. Half the peak services will serve Stratford International; the other half will serve Canning Town. The new service, in common with the existing DLR network, will operate between about 05:30 in the morning and 01:00 at night Monday to Saturday, and about 07:00 in the morning to midnight on Sundays.

Connection with other transport services and infrastructure, both current and proposed, is a fundamental part of the scheme. This includes buses, East London Transit, mainline rail and cycle routes.
Identifying the preferred route

The provision of first-rate transport links is vital to the success of Barking Riverside. Studies have established that the extension of the DLR network offers the most effective way of providing these in a way that best supports growth in the area.

On this basis the Mayor of London instructed DLR to progress an extension of the DLR network, since which time a team of engineers, planners, economists and environmental consultants has been developing and sifting through a large number of options. Initially these looked at different destinations, including Chequers Corner, Dagenham Heathway, Barking, Upminster and Rainham, as well as Dagenham Dock. DLR undertook extensive consultation at this stage to understand the public’s views on the scheme and the different options. Combining the findings of an assessment of potential benefits, costs and constraints with those of the consultation exercise, revealed Dagenham Dock as the best terminus option.

Then the challenge was to find the best route between Gallions Reach and Dagenham Dock. Deciding the route through the Barking Riverside area presented relatively few problems: it is currently derelict land and the new Barking Riverside development will be designed and built to fit around the DLR. However, areas to the east and west of Barking Riverside presented more of a test. The sewage treatment plant at Beckton is the biggest in the UK and deciding the best way past it has involved lengthy discussion with its owner, Thames Water. The site is expanding and the DLR has to avoid the new facilities that are being built.

The River Roding equally presents a number of challenges, since it provides access for ships and is a valued ecological habitat. Determining the route over or under the river has required detailed discussions with the Port of London Authority and the Environment Agency. In the end, a long tunnel that avoided both the sewage works and the river was considered to offer the best solution, despite its extra cost.

East of Barking Riverside, at Dagenham Dock, the challenge was deciding whether the new station should be north or south of the existing rail corridor and, if north, deciding the best way of crossing the rail lines. A northern station was chosen as it was found to best meet the needs for interchange with mainline rail and future bus services, as well as offering better access for existing and future residents nearby. It will, however, require more complex and costly engineering.

So the final scheme represents the best and most cost-effective fit, offering the right mix of economic benefit, social inclusion and environmental protection. Subsequent work has focused on creating a design that best addresses the engineering and environmental constraints that will be encountered.

Choosing the right scheme
Design and the Environment

With a line on the map now drawn, the engineers have been working up the scheme details: determining the locations for the tunnel entrances and the emergency shafts that access the two running tunnels; the design of the bridge over the railway; the exact fit of the alignment past and through different properties; and the precise locations and layouts of the five new stations. They have also established the strategy for building the scheme, determining the locations of worksites and the best routes for accessing these.

Environmental considerations have remained a fundamental part of this. The absence of established communities along much of the route makes some elements of design much simpler to deal with. But the presence of substantial areas of contamination and numerous water courses (together with the various plants and animals that use them) all within an area that is increasingly liable to flood, requires sophisticated engineering and mitigation.

As a result, the design includes:

- measures to protect the Gores Brook system of streams and ditches near Dagenham Dock, and to provide improvements to it where physical impact cannot be avoided
- proposals for the sustainable management of contaminated spoil to ensure that remediation is achieved, as far as possible, on site
- measures to ensure that noise will be controlled at acceptable levels at existing properties and new ones built as part of future development at Barking Riverside and elsewhere.

Many possible environmental impacts would normally occur during the construction period. DLR has therefore developed a code of construction practice, which the scheme contractors must comply with, that describes how construction should be undertaken in ways that minimise the risk of disturbance to people and the environment.
Route of proposed extension
Construction is expected to begin in 2013 and be completed a little over four years later in early 2017, with the newservice starting in 2017. The sequence and duration of different construction activities is illustrated in the schematic programme shown below.

Construction will be undertaken from a series of worksites located more or less alongside the route. These were selected to provide sufficient space for the works that need to take place and to enable relatively easy access onto surrounding roads. The level of construction activity will vary with time. The busiest period is expected to be during 2014, when up to 18 construction vehicles will be on the road network during the rush hour. However, construction traffic generated by the scheme will generally be a lot less.

Although lorries will be essential to bring materials to and take waste from the site, it is planned that DLR will explore opportunities to make use of river transport during the construction phase. However, the exact arrangements for this still need to be confirmed, so the EIA has assumed (as a worst case) that all transport of spoil and materials will be undertaken by road.

One of the main challenges for the construction team will be in managing the estimated 390,000 tonnes of spoil that will be produced, particularly from the tunnelling work. DLR will be looking to enter into agreements with local developers, such as Barking Riverside, to accept some of this for disposal on to their land. However, more than a third of it is likely to be contaminated by chemicals from the previous industrial users, and considerable attention has been paid to finding ways of managing risks from this material so that it can be handled and disposed of safely.

Construction activities 2010 – 2016

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6 Assessing the environmental effects

Many development proposals, by virtue of their size, location or activities, must, by law, have their likely environmental effects assessed and reported. This helps the design to advance in a way that protects natural and cultural resources, and the health and amenity of people. It also helps decision-makers, in this case the Secretary of State for Transport, to understand the environmental impacts of the scheme, and so decide whether it should go ahead.

The way that environmental effects should be assessed and the information this should include are defined in law and related guidance.

The EIA of the DLR scheme has followed these requirements.

Organisations with an interest in the way the EIA was undertaken have been consulted and their responses have helped to modify the approach that was used.

A considerable amount of data has been gathered to ensure that the effects have been assessed as accurately as possible. Extensive stakeholder consultation has taken place in the course of the project. This has improved the quality and quantity of information on the local environment, and so helped improve the accuracy of the EIA.

The environmental effects of the scheme have been predicted for each relevant environmental topic by comparing ‘baseline’ environmental conditions, (i.e. the situation that would be expected to occur without the scheme) against environmental conditions that are likely to arise as a result of the scheme’s construction and operation. Normally, the baseline would be the existing environmental conditions. However, a large part of the area affected by the scheme will be subject to substantial change over the next few years. The EIA has therefore taken into account the likely changes in baseline prior to the construction and operation of the DLR scheme.

Temple Group was responsible for the EIA and they assigned different specialists to carry out assessments on:

- archaeology
- built heritage
- ecology
- water resources and flood risk
- contamination
- landscape and views
- noise and vibration
- air quality
- community resources.

Temple also used information from socio-economic and transport specialists who had been appointed by DLR to undertake particular studies in these areas.

The results of this work are reported in the Environmental Statement and summarised here. They address any temporary effects taking place during the four years of construction; permanent effects due to the introduction of new features or the loss of existing ones; and operational effects from running the new DLR service. They describe whether impacts are good or bad. They also consider how the DLR scheme might influence other development and so result in other secondary effects. Finally, given the huge amount of regeneration taking place generally alongside the Thames in this part of London, they review the possible cumulative effects of DLR in combination with other transport and infrastructure projects.
New jobs

Significant benefits from the DLR extension result from the economic regeneration that it helps to bring about. The scheme will lead to a range of employment opportunities by bringing about a bigger scale, variety and intensity of development in the area generally and at Barking Riverside in particular. By enabling about 6,800 more homes to be built at Barking Riverside than would be possible without it, the scheme will increase the amount of money spent in the local area on shops and services. During construction, the scheme will create the equivalent of some 410 full-time jobs during its construction. Taking into account the larger scale of Barking Riverside that the scheme makes possible, a further 2,200 or so full time equivalent construction jobs may be attributed to the DLR extension.

Permanent jobs on the DLR extension are limited to approximately 20. But the scheme will also result in some 1,100 permanent jobs at Barking Riverside. With other local developments considered as well, this figure rises to about 1,470 jobs due to the DLR extension.

Better access to jobs and services

The scheme will also make it easier for people to get to and from employment centres such as Central London, The City, Canary Wharf, Stratford City and the Royal Docks, benefiting people accessing these jobs, and employers, who will be able to draw from a larger population. The scheme will also improve access to a range of services such as schools, universities, local shops and amenities, health centres and hospitals. Shorter journey times mean that more people can reach key services more quickly, that they have a wider choice of services that are practically accessible, and that specialist services can be more easily reached from a wider catchment area.

Disturbance during construction

Negative effects tend to occur most during construction, which can be noisy and dirty. The scheme’s code of construction practice defines appropriate standards and working methods that will, as a minimum, be used to control impacts to acceptable levels and so minimise the risk of disturbance to people and the environment. By ensuring that the code is followed, many potential impacts – for example from dust – will be avoided. Nevertheless, some existing and new residential areas will be located close to the worksites. Significant construction noise impacts are likely to affect residents around Shaw Avenue and Morrisons Road for up to 14 months in total with a likely visual impact for up to two years.
Construction noise will affect commercial properties around Gallions Reach for up to three years and at the Crooked Billet pub for about a year. And construction noise and vibration will affect the industrial Gemini Business Park (Rosemound Estate), located next to the western tunnel entrance, for up to three years.

Temporary diversion of a footpath near Armada Way over about four years while the road is realigned will require people to walk about 600m further.

Visual impacts from construction of the intervention shaft in Creekmouth, lasting about 19 months, will affect people using the open space area for recreation.

**Impacts from traffic**

As mentioned before, DLR plans to explore opportunities to use river transport to move some of its spoil and bulk materials during construction. But the EIA has assumed (as a worst case situation) that all construction transport will be by road. The local roads in the area are very busy, but road traffic generated from the scheme will not significantly worsen traffic volumes or queues.

Traffic generated by the operating scheme will be very low. But by allowing development at Barking Riverside at a much larger scale than would otherwise occur, the scheme will indirectly cause larger increases in road traffic. This will not result in additional traffic delays on main roads, but is expected to cause significant local increases in traffic around Beckton Riverside, Creekmouth and Goresbrook DLR stations and in the vicinity of Canary Wharf. It will also lead to an increase in traffic noise for some residents on Renwick Road, and for some residents, as well as some commercial properties, on Gallions Road and Armada Way.

It will, however, generally cause only a small increase in air pollution on existing roads. At two locations on Renwick Road increases are expected to be significant, but even here pollution levels will not go above national air quality objectives.

**Impacts from trains**

Significant noise and vibration impacts from trains on viaduct and in tunnel may affect future residents alongside the route. DLR will determine where these impacts might occur as the scheme design progresses and as leasehold proposals become known. Working with the developers of these proposals, the scheme engineers will then take steps to avoid these impacts where possible.

**Impacts on other public transport services**

There will be a reduced risk of future overcrowding on other public transport systems as a result of the new DLR service. This is particularly the case at West Ham Underground station and at West Ham, Rainham and Dagenham Dock mainline stations.

In the long term, avoiding landtake within Creekmouth open space and providing landscaping of the shaft structure and access road will ensure the recreational use of the area can continue without significant loss of amenity. The viewing facility at the shaft structure will provide a new attraction, which will enhance the amenity value of the open space and provide a significant benefit.
8 Effects on natural resources

Landscape change
Natural resources are limited in this area, as it has been subject to years of industrial use and pollution. The landscape is now highly degraded and will be greatly enhanced by future development in the area, particularly at Barking Riverside. The scale of this development, and the landscape improvements associated with it, are highly reliant on the provision of the scheme. However, there will be a temporary adverse effect from the occupation of a large part of Creekmouth open space during construction of the intervention shaft.

Wildlife and water
Wildlife is present in many places. Pockets of habitat remain in the area, often associated with the streams and channels that flow down to the Thames. The Thames foreshore is of particular importance and supports many invertebrates and the birds that feed off them. The relative lack of disturbance over the last few years has also resulted in wildlife visiting and breeding in the area.

The main risks to the wildlife come from landtake and habitat loss and, during construction, from disturbance. Protection of wildlife during construction will be achieved through adherence to the code of construction practice. This addresses general measures to avoid impacts on, for example, breeding or wintering birds, as well as more specific measures aligned to particular elements of the scheme. In applying this code, DURL will ensure that risks to wildlife are greatly reduced. There is, however, a risk of disturbance to birds at Creekmouth open space. There is also a risk of disturbance to an uncommon species of water shrimp if the jetties are used during construction.

There are a few areas affected by the scheme which, because of their location within London, are of local importance for wildlife; for example, the wasteland once occupied by Beckton gasworks, and the grassland south of Cheats Road. However, these affected areas are small parts of a much larger resource and their loss will not be significant.

Greater habitat loss will result from other developments, such as Barking Riverside, and through its influence on the scale of this development, the scheme may be considered to contribute to this loss. But equally, ecological enhancements associated with these developments may be partly credited to the scheme. For example, Barking Riverside will feature a network of enhanced open spaces, providing a diversity of habitats and corridors to allow the spreading of vegetation and movement of animals across the development and into adjacent areas.

One feature requiring particular care and attention is the Gores Brook. Crossings and two diversions of this watercourse have presented the engineers with a challenge in terms of maintaining water quality and the integrity of the watercourse, safeguarding flood storage capacity and mitigating any potential impacts on the aquatic habitat and the wildlife it supports.

The areas affected by the scheme are of low ecological quality. But measures will be taken to maintain and, where possible, enhance this quality. Improving water quality and provide increased flood storage.

Contamination risks
Another key risk to environmental resources is from contaminated land. The area’s industrial heritage has left a legacy of soil pollution, which presents a risk to groundwater resources and to human health. Many former industrial sites have now been sealed so that contamination is contained; for example, the former Beckton gas works and various locations at Barking Riverside. Considerable contamination remains, however, and even the ‘remediated’ sites present a risk should the scheme impinge upon the sealed materials.

Overall some 150,000 tonnes of contaminated materials are expected to be excavated during construction. DURL has set out a strategy for managing spoil generally, which prioritises its reuse. If feasible, in adjacent areas such as Barking Riverside, following any treatment that may be required. Disposal off site to landfill is the least favoured option. The final outcome will depend on the characteristics of the spoil that emerges, as well as on arrangements agreed with affected parties, such as Barking Riverside Ltd. Any remediation that comes about as a result of the scheme will be deemed a benefit.
9 Effects on heritage

**Historic buildings**
No buildings of any more than local historic importance remain in this area or are affected by the scheme. The setting of the 19th-century ticket hall at Dagenham Dock will be affected by the new station. However, by integrating it within the new station the building will enjoy protection and continued use as part of the railway.

**Archaeology**
Prediction of effects on any buried archaeological remains is less certain. There are no known historic sites in the area crossed by the scheme. But there are enough previous findings, including prehistoric flints, metal tools, boats and ships, trackways and medieval and post-medieval buildings, to suggest a more or less continual human presence over several thousand years.

The area was tidal salt marsh until around the 18th century, when maps indicate its reclamation to pastoral farmland. The waterlogged conditions have been crucial in preserving some organic features that might have been lost on dry land sites; for example, several prehistoric trackways. It is likely, however, that industrialisation and more recent remediation will have destroyed deposits in some places.

The scheme avoids the area that probably has the highest archaeological potential, and its alignment on viaduct or on piled foundations greatly reduces its potential for impacts on archaeological resources. But the substantial excavation at each end of the tunnel will present a significant risk of impact.

The need for, and scope of, a programme of archaeological works will be agreed in advance with the local authorities once a detailed design is in place. This would, if required, determine the need for any specific mitigation. The enhanced knowledge that such studies would reveal would be a significant benefit.
10 Cumulative effects: the scheme and other developments

The Thames Gateway stretches 40 miles along the Thames Estuary from Canary Wharf to Southend in Essex and Sittingbourne in Kent. Subject to years of industrial decline it is now the focus of the biggest regeneration project in western Europe, with 160,000 homes projected to be built by 2016 and 180,000 jobs created. In addition, other infrastructure projects related to this wider development, as well as other unrelated schemes, are all responsible for massive environmental change in the area.

As described above, the scheme will directly influence the scale, variety and intensity of some of this development. Where this linkage is known – for example, at Barking Riverside – the effects due to the scheme have already been described. In other cases, the link is less clear or may be absent. Nevertheless, with this scale of construction, there is a possibility that the different developments will act together to cause environmental impact.

Other projects with which the scheme may have such a ‘cumulative’ impact include mixed use developments such as Barking Riverside; Beckton Riverside; Creekmouth – Castle Green; South Dagenham AXA Site; and the Sustainable Industrial Park. They also include other transport schemes, including the East London Transit and Thames Gateway Bridge. And they include infrastructure projects, namely the Lee Tunnel and Thames Tideway Tunnel; and the Thames Water Desalination Plant.

The main areas for which a potential for cumulative effects exists are as follows.
• cumulative incremental changes to habitats and the plants and animals they support
• increased hard surfaces, placing an increased strain on drainage systems and increased risk of localised flooding
• increased population, with associated increases in traffic and
• temporary peaks in traffic, air pollutants and noise levels during some years when construction activities are most intense.
11 Sustainable development

A separate appraisal of the scheme against 20 sustainable development objectives was undertaken in parallel with the EIA. These were based on the Government’s four sustainable development objectives, namely:

• achieving more with less – sustainable consumption and production
• reducing greenhouse gases and combating climate change
• protecting natural and cultural resources and enhancing the environment; and
• creating sustainable communities – places where people want to live and work, now and in the future.

This shows that the scheme is highly supportive for seven of the objectives (all related to creating sustainable communities). It is supportive of four and opposed to two. It is neutral in respect to the other seven.

The scheme is highly supportive of social and economic elements of sustainability. It is supportive in terms of its provision of an energy-efficient form of public transport. It is generally neutral in respect to its impact on natural and cultural resources, although its use of derelict land (and its support to Barking Riverside), which will bring about significant improvements in the land resource, is positive. Its main opposition to sustainability principles is associated with materials used and, in particular, of concrete and steel, which requires large amounts of energy to produce and so results in large carbon emissions.
DLR is seeking the necessary powers and approvals to acquire land and rights in land, and to build and operate the scheme by applying for an Order under the Transport and Works Act 1992. The application comprises documents describing the works and powers sought, and it includes the Environmental Statement, of which this non-technical summary forms a part. These documents are available to review at various locations listed on the back cover of this summary.

Statements of objection or support may be made by anyone with a direct interest in the scheme, and must be sent to the Secretary of State within six weeks of the date of application. Objections or support will be considered through a public inquiry, which, if required, will take place in late 2008 or early 2009.

The public inquiry will be presided over by a planning inspector. Following the receipt of the inspector’s report, the Secretary of State will determine the application, either making the Order (with or without changes) or refusing to make the Order.

For more information, you can e-mail us at dagenhamdock@tfl.gov.uk or call 020 7987 4244. Further information on this scheme can be viewed at www.dlr.tfl.gov.uk
Artists' impressions

Below: Intervention shaft within Creekmouth Open Space
Bottom: Dagenham Dock station