

Report for the London Assembly Transport Committee

Document Number: CR-XRL-Z-RGN-CR001-50004

Document History:

Version:	Date:	Prepared by:	Checked by:	Authorised by:	Reason for Revision:
1.0	27-02-13	Luke Jouanides	Sarah Johnson	Andrew Wolstenholme	For issue to the London Assembly Transport Committee

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Contents

1	Introduction	3
2	Delivery: progress, scope, risk and schedule	3
2.1	Progress & achievements.....	3
2.2	Scope	9
2.3	Risk management.....	10
2.4	Programme schedule	11
3	Health and Safety	12
3.1	Performance	12
3.2	Cycling safety	14
4	Cost and financial performance.....	14
5	Land and property	15
5.1	Land acquisition.....	15
5.2	Crossrail Property Impact Study.....	16
6	Crossrail Procurement: business opportunities & supply chain management.	16
6.1	Business opportunities.....	16
6.2	Supply chain management	16
7	Crossrail Skills and Employment Strategy	18
8	Sustainability.....	19

1 Introduction

Considerable progress has been achieved by Crossrail Limited (CRL) over the past year. CRL fully entered its delivery phase early in 2012 following the mobilisation of its largest civil construction contracts. As expected, this step-change in construction activity has required CRL and its Main Contractors to respond to a number of delivery issues.

The CRL Executive and its Board however remain confident that the Crossrail Project will be built on time and within its funding envelope.

This report has been produced for the London Assembly Transport Committee ('the Committee') following their invitation to the Chairman and Chief Executive of CRL to attend the Committee on 7 March 2013 to provide an update on the progress of the Crossrail Project.

The report provides an update to the information that was provided ahead of, and following CRL's previous appearance before the Committee on 21 February 2012. The report provides an overview of construction progress and the particular issues that were identified within the Committee's invitation letter. This report shall therefore provide updates on:

- Delivery: progress, scope, risk and schedule;
- Health and safety;
- Cost and financial performance;
- Land and property;
- Crossrail procurement: business opportunities and supply chain management;
- Crossrail Skills and Employment Strategy; and
- Sustainability.

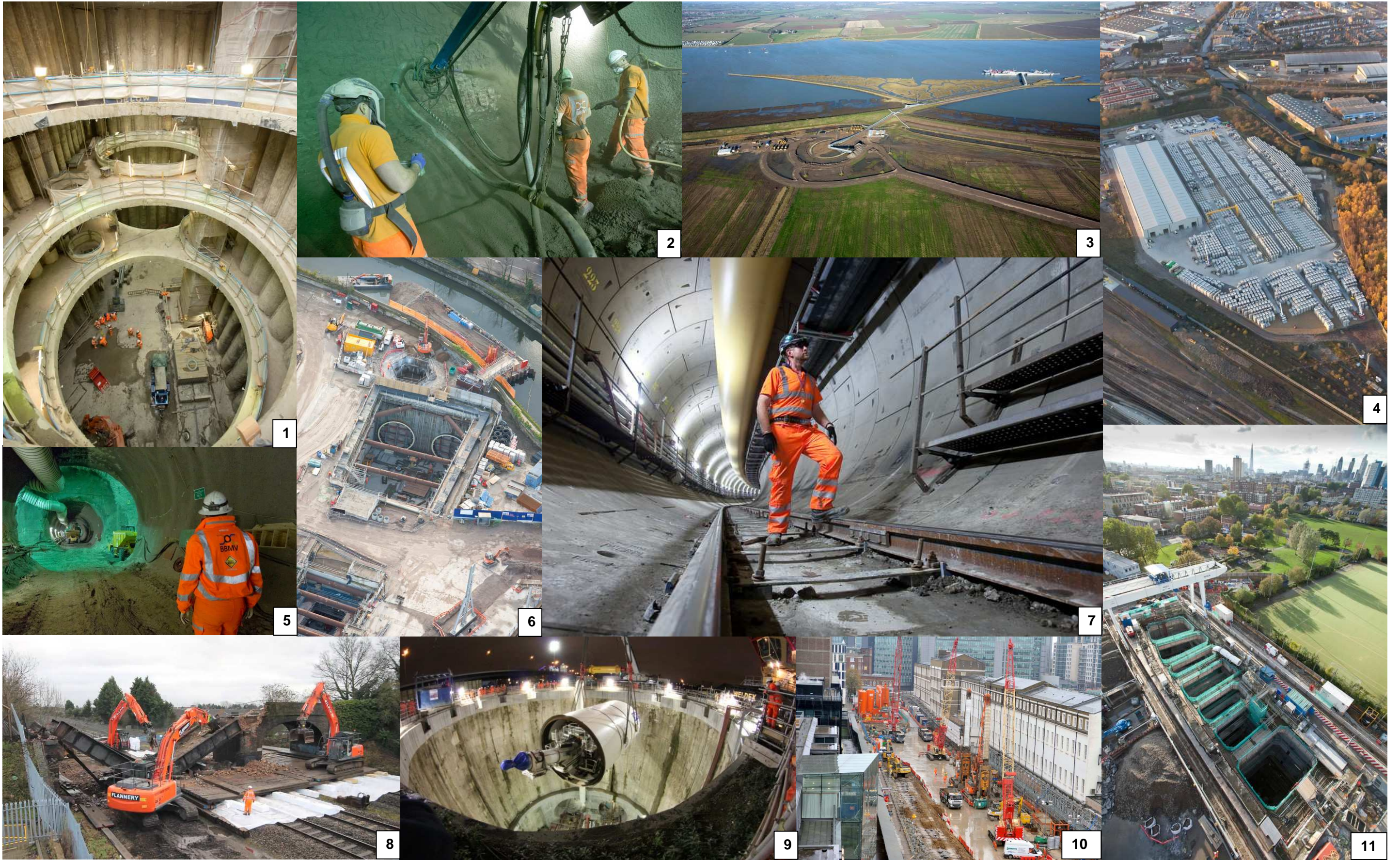
2 Delivery: progress, scope, risk and schedule

2.1 Progress & achievements

During 2012 the Crossrail Project achieved a number of key construction and procurement milestones. Page 4 overleaf provides a selection of images which help to illustrate some of the key achievements.

The rest of this section will provide updates for each section of the Crossrail Project, linking each image to works taking place as part of the:

- Central Section works;
- Surface Section works; and
- Rolling Stock and Depot.



Key for images on page 4:

1. Bond Street: Hanover Square access shaft
2. Bond Street: Sprayed Concrete Lining works
3. Wallasea Island
4. Old Oak Common: western tunnel drive tunnel segment manufacturing plant
5. Whitechapel: Sprayed Concrete Lining works
6. Pudding Mill Lane: portal construction
7. Tunnelling: inside Phyllis's bored tunnel
8. Horton Bridge: demolition during Christmas possession of railway
9. Tunnelling: lowering of Victoria into Limmo launch shaft
10. Paddington: Eastbourne Terrace work site
11. Stepney Green: construction of access shaft

2.1.1 Central Section works

CRL launched two tunnel drives in 2012 and a third early in 2013 all of which are hugely significant construction milestones. Five Tunnel Boring Machines (TBMs) are now active creating the 42km of Crossrail running tunnels beneath London (image 7 is taken from the western tunnel drive). Table 1 provides the names, locations and progress for the TBMs that are tunnelling as part of the three tunnel drives that have been launched:

	Name	Drive	Distance to date (m)	Approximate length of drive (m)
1	Phyllis	Royal Oak – Farringdon	2,510	6,850
2	Ada	Royal Oak – Farringdon	2,016	6,830
3	Elizabeth	Limmo – Farringdon (image 9)	149	7,370
4	Victoria	Limmo – Farringdon (image 9)	142	7,370
5	Sophia	Plumstead – North Woolwich	160	2,700
6	Mary	Plumstead – North Woolwich	To be launched May 2013	2,700

Table 1 – TBM progress

The launch of each TBM was enabled by the achievement of other key milestones, such as the construction and commissioning of tunnel segment factories at Old Oak Common (image 4) and Chatham, the construction of tunnel portals at Royal Oak and Plumstead and a launch shaft at Limmo, along with the commissioning of a new logistics facility at Northfleet to process and load excavated materials onto barges to be shipped to the new Wallasea Island wildlife reserve that CRL is delivering in the Thames Estuary (image 3).

Deep access shafts have now been excavated at most Central Section station locations (image 1 – Bond Street Hanover Square, and image 11 – Stepney Green access shaft). The completion of these shafts has enabled the commencement of Sprayed Concrete Lining (SCL) tunnelling activities at Liverpool Street (Finsbury Circus), Bond Street (Hanover Square) and Whitechapel (Durward Shaft site) – see images 2 & 5. These SCL

works are mainly being used to create station platform tunnels and passenger cross passages.

During 2012 CRL also commenced the excavation of the Paddington Station box which runs alongside MacMillan House to the west of Paddington Station (image 10). This required the full closure of Eastbourne Terrace. CRL has worked with Westminster City Council and Transport for London to limit disruption to local roads and bus routes. CRL appreciates that there remains residual disruption for people and businesses in the area and is grateful for their patience: Eastbourne Terrace shall be partially re-opened in February 2014 for bus traffic once the excavation of the new station box is complete.

At Farringdon and the surrounding area a number of unplanned utility strengthening works have had to be undertaken ahead of the arrival of the TBMs. Some of these required additional road or lane closures. These works have caused local disruption, and CRL is grateful for the patience of local people and businesses.

Alongside achieving a number of construction milestones, a number of significant procurement milestones were achieved over the past year: contracts were awarded for the main station works for Bond Street, Tottenham Court Road, Liverpool Street and Custom House stations.

CRL has also progressed with the procurement of its railway systems contracts. These contracts involve the installation, testing and commissioning of the new Crossrail railway infrastructure, including its signalling, traction power and communications systems.

Table 2 provides an update on those milestones identified in CRL's 2012 report to the Committee:

Milestone	Date Achieved
Paddington: Taxi transfer from Departures Road completed	11 Feb-12
Custom House: Issue ITT for Main Station works	28 Feb-12
Liverpool Street: Award Main Station works contract	13 Mar-12
Victoria Dock Portal: Award contract for portal	12 April-12
Tunnel fit-out activities (track, OHLE & Tunnel Mechanical): Issue ITT	30 Apr-12
Western running tunnels: Commence tunnelling	03 May-12
Thames Tunnel: Commence manufacturing of tunnel segments	10 May-12
Eleanor Street & Mile End Shafts: Award main works contract	05 June-12
Tottenham Court Road: Award Main Station works contract	04 July-12
Bond Street: Issue ITT	16 July-12
Eastern running tunnels: TBM erection and commissioning	12 Oct-12
Signalling: Award contract	09 Nov-12
Farringdon: Complete advance works at Eastern Ticket Hall	23 Nov-12
Bond Street: Award contract for Main Station works	01 Feb-13

Table 2: 2012 Central Section achievements

2.1.2 Surface Section Works

The Surface Section works will be delivered by Network Rail and comprise railway and station enhancement works on the routes west of Paddington to London Heathrow and Maidenhead, and routes east of Pudding Mill Lane and Plumstead to Shenfield and Abbey Wood.

In April 2012 the Crossrail Sponsors and Network Rail agreed that the Surface Section works would be delivered within a £2.3bn funding envelope.

In terms of delivery activities, Network Rail has started the construction of the new grade separated Stockley Viaduct where the Heathrow spur joins the Great Western Mainline. On completion of Crossrail this will double the capacity of the Heathrow Spur.

During planned possessions of the Great Western Mainline over Christmas 2012 three bridges were demolished along the Great Western Mainline, with a new bridge constructed at Horton. The bridges that were demolished will be replaced later this year, with structures with larger clearances from the railway to enable new overhead electrification equipment to be installed along the Great Western Mainline (image 8). Works also took place at Acton Yard to reconfigure the railway track layout to facilitate the future construction of a railway dive-under. The Acton dive-under will significantly

increase capacity on the Great Western Mainline, thereby accommodating the additional passenger services created by Crossrail.

Design activities for the upgrade works to be undertaken at Surface Section stations have now reached GRIP 4 maturity. A detailed overview of the station improvements to be delivered by Network Rail was provided to the Committee following CRL's appearance before the Committee in February 2012.

During 2013 Network Rail will progressively submit its Schedule 7 requests for approval to Local Planning Authorities in accordance with the Crossrail Act.

2.1.3 Rolling Stock and Depot

The programme for awarding the contract for the design, construction and maintenance of the Crossrail Rolling Stock and Old Oak Common Depot has progressed in 2012.

The Invitation to Negotiate (ITN) was released on 28 February 2012 to the four shortlisted bidders:

- Bombardier Transportation (UK) Limited;
- Construcciones y Auxiliar de Ferrocarriles SA (CAF);
- Hitachi Rail Europe Limited; and
- Siemens plc.

At the end of October 2012 CRL received tender submissions from each bidder, and commenced its evaluation. The outcome of the evaluation will be a down-selection from four bidders to two and this process will conclude in the spring later this year.

The two remaining bidders will then progress through a second round of evaluation, which will conclude with the contract being awarded in spring 2014.

2.1.4 Future milestones

Looking ahead, tunnelling and station excavation activities will continue to be the predominant activities managed by CRL in 2013. The procurement of the main system-wide contracts will also continue, with several significant contract awards planned for 2013. These are summarised in Table 3 below:

	Milestone	Forecast completion
1	Procurement: Award System-wide Telecoms contract	Feb-2013 (Complete)
2	Procurement: Award System-wide Traction Power contract	Mar-2013 (Complete)
3	Procurement: Award System-wide Main Works (track, OHLE, communications) contract	April-2013
4	Tunnelling: East TBMs breakthrough Canary Wharf station box	April & May-2013
5	Tunnelling: West TBMs breakthrough at Bond Street (Hanover Square)	April-2013
6	Tunnelling: West TBMs breakthrough at Tottenham Court Road	June-2013
7	Surface Section: Award contract for Ilford stabling yard	May-2013
8	Operations: publish ITT for Crossrail Train Operating Company (CTOC)	Aug-2013
9	Paddington: Complete excavation & roof slab complete	Oct-2013
10	Tunnelling: South-east TBMs breakthrough Woolwich station box	May & Sept-2013
11	Paddington: Re-open Eastbourne Terrace	Feb-2014

Table 3: 2013/14 Milestones

2.2 Scope

During 2012 no major changes have been implemented to the scope of the Crossrail Project nor to the phased opening strategy for Crossrail. The Crossrail route and service destinations have not therefore changed since the Crossrail Act received Royal Assent in 2008.

In 2012 the Committee requested, and CRL subsequently provided, clarity on whether additional stations would be delivered at Woolwich and Kensal Green, and how Crossrail could serve the proposed Old Oak Common interchange station to be delivered as part of the High Speed 2 project: the latest information for each of these locations is provided below.

2.2.1 Woolwich

Provision was included in the Crossrail Act for a Crossrail station at Woolwich to be part of the Crossrail network. Arrangements were put in place between the Crossrail Sponsors, CRL and Berkeley Homes for Berkeley Homes to construct the station box.

Berkeley Homes completed the construction of the station box in February 2013, four months ahead of its baseline programme.

The fit out of a fully operational Crossrail Woolwich station is a matter for the Crossrail Sponsors. CRL understands that discussions continue which are addressing necessary private sector contributions. An outline of a funding package is now in place and is expected to be finalised over the next few months. This should enable CRL to design and procure the fit out in an efficient way, and for a Woolwich Station to be ready for the opening of Crossrail.

2.2.2 Kensal Green

The introduction of a Kensal Green Station into the Crossrail Project scope is a matter for the Crossrail Sponsors.

CRL's understanding is that the Mayor is considering options for improved connectivity at Kensal Rise and will offer to meet jointly with the Royal Borough of Kensington and Chelsea, and HM Government to discuss the matter further.

By way of background, no provision for a Crossrail Station at Kensal Green was included in the 2008 Crossrail Act. Nonetheless the Royal Borough of Kensington and Chelsea has sought to promote the inclusion of a Crossrail Station at Kensal Green. As outlined in 2012, the Crossrail Sponsors have set the following three conditions that would need to be satisfied before a Crossrail Station at Kensal Green could be included as part of the Crossrail Project:

- That there would be no disruption to current and future services on the Great Western mainline;
- That there should be no delay to the overall Crossrail Programme; and
- That it should not add to the Crossrail Project costs.

The impact of the Government's High Speed 2 Project has also had to be considered, in terms of whether the provision of a Kensal Green Station can be compatible with the future delivery of an Old Oak Common interchange station. CRL has informed the Crossrail Project Sponsors that a decision on whether to include a Kensal Green Station would need to be made by the mid-2013 to avoid delays to the delivery of the Crossrail Project.

2.2.3 Old Oak Common

The Government's current proposals for High Speed 2 include an Old Oak Common interchange station to the south of where the new Crossrail Depot will be constructed by its Rolling Stock and Depot Service Provider (see section 2.1.3 above). It is assumed that this would be designed, delivered and funded as part of High Speed 2 project. There have been no discussions concerning the delivery of the station at Old Oak Common as part of the Crossrail Project.

2.3 Risk management

Risk management is critical to the successful delivery of Crossrail. The Crossrail Project has continued to identify, assess and manage risks and uncertainties through its embedded Risk Management process. This has resulted in benefits: there are an increased number of planned risk mitigation activities that have reduced overall levels of risk exposure.

CRL has also cascaded its risk management approach to its Main Contractors and the wider supply chain. Contractors are required to follow CRL's Risk Management process to recognise and control risks to their works on site, and to use CRL's systems to report their top risks and risk management performance.

The most significant strategic risks being managed by CRL are:

- Macro-economic impacts on suppliers: CRL continues to operate in a challenging economic environment, which creates a risk that companies within the Crossrail supply chain face financial difficulties which could have consequential impact on progress. CRL is working with its Main Contractors and the wider supply chain to identify early any areas of concern and provide support where possible.
- Catastrophic failure of works: The nature of CRL's work means that this risk remains on the risk register, however considerable effort continues to be applied to ensure that all works are delivered safely and to high standards of quality. Initial feedback from CRL tunnelling activities has reported that they are extremely well controlled and progressing well. The residual risk of failure is regarded as low, however given the scale of tunnelling and excavation activities this remains a significant risk for the Crossrail Project.
- Railway Integration: Crossrail services will run through the new tunnelled Central Operating Section and on to the suburban national network to the east and west of London. Integrating the new Crossrail systems with the existing railway systems on the national network presents a significant risk and is reliant on works being delivered by other parties, such as Network Rail. This could undermine the timely delivery and commissioning of Crossrail.

2.4 Programme schedule

Figure 2 provides a high level overview of the Crossrail Project in terms of the sequencing of works and progressive opening of the Crossrail network: no changes were made to the high level schedule in 2012:

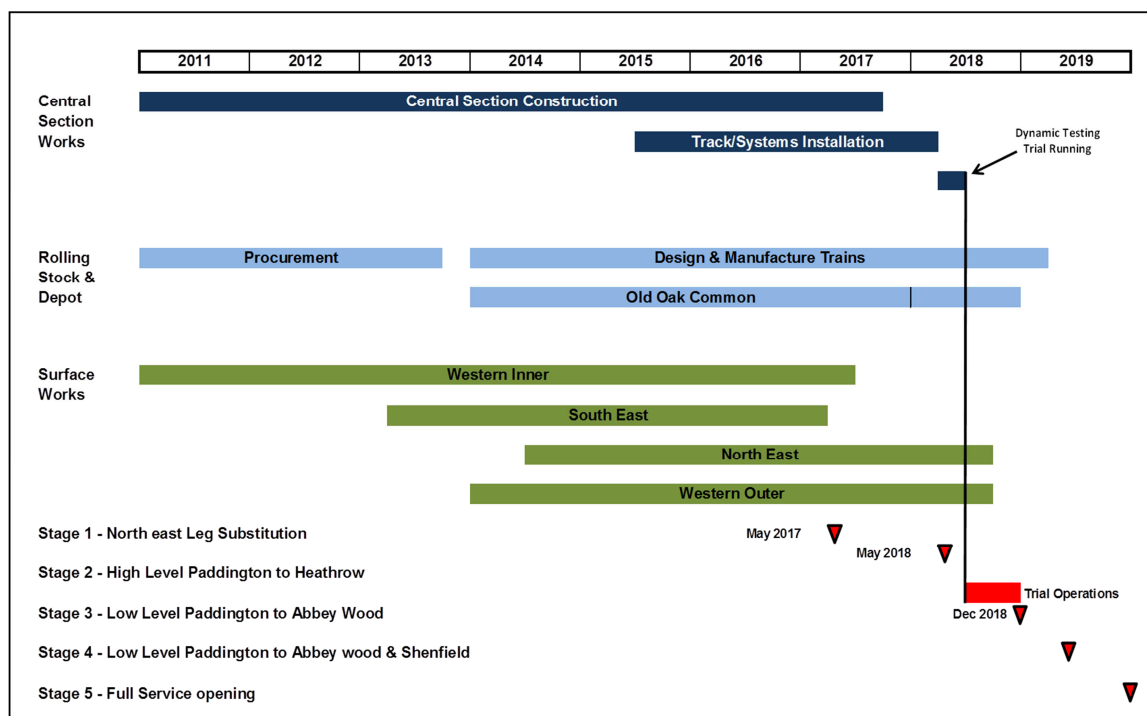


Figure 1: Crossrail High-Level Programme

3 Health and Safety

3.1 Performance

The health and safety of all those working on and interacting with the Crossrail Project remains the foremost priority for CRL.

The Target Zero 'A State of Mind' campaign remains at the heart of the Crossrail Project. Its three guiding principles continue to be actively communicated to all CRL employees, Industry Partners and Contractors:

- We all have the right to go home unharmed every day;
- We believe all harm is preventable, and;
- We must all work together to achieve this

The Crossrail Health and Safety Improvement Team monitor and record all incidents, including near misses. The team identify through trend analysis areas where improvement can be made, and development and implement initiatives to reduce incidents.

In 2012/13, 11 RIDDOR Major Injuries and 25 lost time (3+ days) incidents occurred. On a 13 period rolling basis this resulted in a programme-wide Accident Frequency Rate (AFR) of 0.24 at the beginning of 2013, as shown in Figure 2:

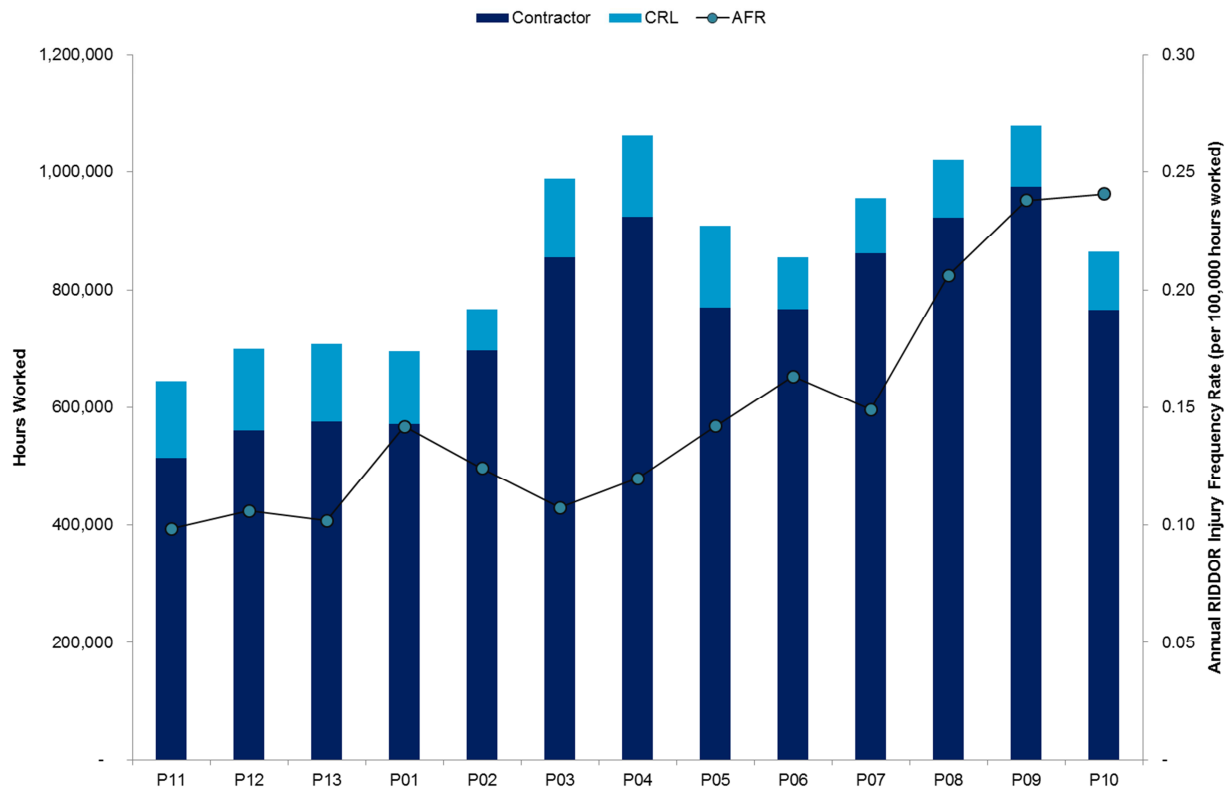


Figure 2: Crossrail programme-wide AFR

This performance compares well to the rest of the construction industry, however as the construction phase intensifies CRL will ensure that it maintains focus on reducing health and safety incidents by maintaining high standards of health and safety training and vigilance as the Crossrail Project advances.

During 2012 CRL implemented a new mechanism to enable health and safety performance to be measured comparatively across the Crossrail Project. This enables best practice and improvement areas to be identified and shared. This has resulted in a comparative Health and Safety Performance Index (HSPI) that has been cascaded to CRL's Main Contractors.

Furthermore, in April 2012 Crossrail launched the 'Crossrail Gateway' scheme, which drives health and safety excellence by promoting the raising of standards and the sharing of best practice across the Crossrail Project.

Each year there are three assessment cycles for evaluating a contractor's approach to health and safety. A successful completion of each assessment cycle leads to the award of Gateway Foundation, Commendation, or Inspiration Status. A number of awards have already been presented to our contractors. It is a vehicle for incentivising, measuring, recognising and celebrating identified H&S excellence on the Crossrail Project and across the construction industry.

3.2 Cycling safety

Over the past three years CRL and its Contractors have worked to redraw the boundaries of the traditional Health & Safety model. CRL's road safety initiatives fall under 4 categories:

- Vehicles and Junctions – Placing contractual requirements for all construction vehicles (vans and HGVs) to meet specific safety standards by fitting additional equipment to standard construction vehicles. CRL also undertakes checks of vehicles arriving on site to ensuring that the required safety equipment is in good working order.
- Behavioural Change – Providing a Lorry Driver Induction Training (LDIT) programme for all frequent drivers to Crossrail construction sites
- Raising Awareness – Delivering half day seminars for personnel from CRL, its Main Contractors and haulage companies to raise awareness of individuals' obligations under the Corporate Manslaughter Act
- Supply Chain Support – Establishing a Crossrail working group dedicated to helping Contractors maintain compliance and identify and share best practice.

By February 2013 the Lorry Driver Induction Training (LDIT) programme had trained 4,267 drivers, and organised 257 one day courses. LDIT was the primary initiative that helped CRL win the prestigious Institution of Occupational Safety and Health's Transport & Logistics Safety Award in October 2012.

4 Cost and financial performance

CRL undertakes half-yearly detailed reviews of its Investment Model. The review period aligns with the financial year. The last such review was undertaken in September/October 2012 following which CRL reported the following cost forecast to the Crossrail Sponsors:

- The Crossrail P95 AFC and AFCDC to be £14,434m and £12,309m respectively; and
- Total expenditure from the commencement of the Crossrail Project (1 April 2007) is now approximately £3.9bn.

During 2013, the majority of CRL expenditure will be on: tunnelling activities (tunnel drives and sprayed concrete lining works, alongside removal of excavated materials) excavation of station boxes and supporting shafts; portal construction works at Pudding Mill Lane, and; concluding advanced works for diverting and strengthening existing utility services.

CRL is currently in the process of finalising the business plan for 2013/14 but anticipates that the budget for the year will be in the region of £1.9bn.

The contingency for the programme is held at a number of different levels including a proportion that is held by the Crossrail Sponsors and a proportion that is held by the Crossrail Board. CRL's view is that the contingency levels are appropriate for a programme of the scale and complexity of Crossrail.

Notes:

AFC – Anticipated Final Cost - Anticipated Final CRL costs plus Network Rail costs in delivering the Surface Section works, and the costs of the Depot.

AFCDC – Anticipated Final Crossrail Direct Cost – third party delivered spend (Network Rail and Depot) and Network Rail Finance Charge excluded.

P95 – Risk at a probability level of 95%.

Total expenditure - Includes monies paid out in relevant periods, including committed land and property expenditure where this has not yet been paid. It does not include future expenditure on construction contracts that have been awarded.

CRL continues to forecast that the delivery of the Project will be achieved within the revised £14.8bn funding envelope set by the Crossrail Project Sponsors following the 2010 Comprehensive Spending Review (CSR).

5 Land and property

5.1 Land acquisition

CRL is acquiring land across London and beyond to deliver Crossrail. This is at an advanced stage. By the end of 2012 CRL had committed £749m of expenditure on land and property acquisitions. This is approximately 91% of CRL's forecast total expenditure on land and property.

The Crossrail route is divided into 167 work areas. 120 of these have been acquired and possession has been taken. Notices have been served for a further 14 work areas and possession of those will be taken in the very near future, taking the total number of completed work areas to 134 (80%). Of the remaining 33 work areas, 28 are either approved or are soon to be approved enabling notices to then be served.

By the end of 2012, 7,136 notices had been served to acquire property interests or rights in properties. 5,576 of those were for subsoil interests and 1,560 were for surface interests (1,317 in the Central Section and 243 in the Surface Section). CRL estimates that a further 700 notices need to be served to acquire the remaining land interests for the project.

The Crossrail Act 2008 provides compulsory purchase powers for a period of five years: these will therefore expire on 21 July 2013. Remaining acquisitions are therefore being managed carefully by CRL to ensure that the requisite notices are served prior to the expiry of its powers.

CRL has always been sensitive to how its land acquisition activities affect local people and businesses. Along with paying compensation in accordance with the statutory compensation code, CRL provides practical assistance to support the relocation of individuals and organisations affected by its land acquisition activities. Compensation claims are managed proactively to ensure that all affected parties are treated fairly and consistently.

Claims are expected to be received after the expiry of compulsory purchase powers. To date 578 claims have been received, reflecting 83% of the total currently forecast to be

received. Of those, 430 (74%) have been settled and over 93% have received one or more payments of compensation.

5.2 Crossrail Property Impact Study

During 2012 CRL and GVA Grimley undertook an evaluation of the likely impact on land values from the delivery of Crossrail. A Crossrail Property Impact Study was then published in November 2012 which provided an overview of how Crossrail would affect different land uses along the Crossrail route. This concluded that by 2021 Crossrail will:

- Create an average 18% uplift in land values over and above projections for general market growth to 2021;
- Create approximately £5.5bn of additional residential and commercial property value; and
- Support and accelerate the delivery of more than 57,000 new homes and 3.25m square metres of commercial floor space within 1 kilometre of stations along the Crossrail route.

A copy of Property Impact Study is available on the Crossrail website.

6 Crossrail Procurement: business opportunities & supply chain management

6.1 Business opportunities

CRL will soon have awarded all of its main contracts. These contracts are now beginning to generate tens of thousands of opportunities for businesses around the UK. CRL estimate that the Crossrail Project will create in the region of 55,000 jobs as this money filters through the supply chain.

The economic benefits of Crossrail are being felt right around the country, with contracts awarded in every region of the UK. We expect there to be 75,000 business opportunities related to the construction of Crossrail alone. Currently about 97% of all opportunities throughout the supply chain have been awarded to UK based businesses. London businesses in particular are benefitting greatly: approximately one third of the business opportunities, by number have been awarded to London based businesses.

As part of the supply chain, thousands of SMEs will contribute to the construction of Crossrail. To date approximately 58% of contracts, by number have been awarded to SMEs.

Crossrail is currently directly employing approximately 7,000 people across its construction sites. Up to 14,000 people are expected to be directly employed in the construction of Crossrail at the height of construction, which will peak over the next two years.

6.2 Supply chain management

6.2.1 Supporting SMEs

In 2012 CRL provided a detailed overview to the Committee of how it is committed to supporting SMEs and local businesses to take advantage of the business opportunities created by the Crossrail Project.

CRL continues to place the following obligations on its Main Contractors:

- Contractors shall optimise opportunities to bring benefits to the local community;
- Annual 'Meet the Contractor' events shall be arranged by each Contractor and shall target diverse subcontractors and suppliers, in particular from the local community;
- Contractors shall use 'CompeteFor' to advertise all appropriate subcontractor and supplier opportunities, and;
- The Contractor shall use reasonable endeavours to ensure that subcontractors and suppliers of any tier use CompeteFor.

CompeteFor is a web-based system that CRL utilises that matches buyers and suppliers based on their respective requirements and company profiles. More than 170,000 companies are registered on CompeteFor and they are predominantly UK based businesses with about one third based in London.

CRL strongly encourages all SMEs that contact us to register on CompeteFor in order to receive notifications of emerging supply chain opportunities relating to Crossrail. The use of CompeteFor for all appropriate supply chain opportunities is mandated in all Crossrail construction contracts. As a consequence over 1,500 opportunities have been published on CompeteFor with a collective value between £170m and £270m. Over the course of the Crossrail Project CRL expects at least 3,000 indirect opportunities to be advertised via CompeteFor.

CRL also employs a fair payment charter for suppliers. This involves Main Contractors using 'Project Bank Accounts' that protect the payments owed to subcontractors and suppliers in the event of them experiencing financial difficulties. CRL was recently commended by the National Specialist Contractors Council for its fair payment mechanics.

6.2.2 Workforce management

CRL contracts include provisions on the London Living Wage and Trade Union membership.

Contractors are required to pay its employees an hourly wage (or equivalent of an hourly wage) of not less than the London Living Wage, and use reasonable endeavours to ensure that subcontractors and suppliers are doing the same for their employees. Contractors across the programme ensure that all individuals working on site are aware of the London Living Wage requirement. Equality and diversity data is also collated on a quarterly basis, with the majority of contractors having put in place measures to capture data during the induction process.

In recent months allegations have been made about the blacklisting of construction workers within the construction industry.

No allegations have however been made about blacklisting by contractors working on the Crossrail Project.

All contractors working on the Crossrail Project must comply with the Employment Relations Act 1999 (Blacklists) Regulations 2010 which explicitly outlaws the blacklisting of construction workers. CRL would take firm, decisive and immediate action if substantive evidence of blacklisting was presented regarding any contractor working on the Crossrail Project.

7 Crossrail Skills and Employment Strategy

CRL provided a detailed overview of its Skills and Employment Strategy in its 2012 submission to the Committee, and has continued to promote training and employment opportunities across its four main skills objectives:

- Maintaining safety;
- Inspiring future talent;
- Supporting local labour, and;
- Revitalising the skills base.

Over the past year the notable areas of progress have been:

- **Tunnelling and Underground Construction Academy (TUCA)** - CRL agreed a five year training delivery contract with the National Construction College in June 2012.

TUCA now provides a number of pre-employment and work-force development training courses. By the end of 2012, 1,405 individuals had attended pre-employment courses on a range of construction and tunnelling related topics, of which 53% were from black or minority ethnic backgrounds (this is in addition to Tunnel Safety Card training – see below)

Other more advanced, and internationally recognised skills courses are also now provided at TUCA on topics such as Sprayed Concrete Lining (SCL) and tunnel locomotive operations.

CRL has also launched a new Supervisor Leadership programme, with the support and involvement of several of its Main Contractors. The course will develop a new industry standard for leadership for mid-level site managers.

- **Tunnel Safety Card** - CRL established an accredited Tunnel Safety Card (TSC) in response to an industry need for standardised tunnelling health and safety training. By the end of 2012 1,652 individuals had undertaken the course, with an 89% pass rate. The successful attainment of the TSC is a requirement for any individual wishing to access Crossrail tunnelling sites. The TSC supports individuals seeking to pass the more advanced Health and Safety Tunnelling Operations Test.
- **Apprenticeships** – By early 2013, 146 apprentices had joined the Crossrail Project across a variety of disciplines: CRL is confident that it will meet or exceed its target for 400 apprenticeships across the lifetime of Crossrail.
- **Work placements** – CRL has a target of providing 350 work placement opportunities for 14-19 year-olds across the Crossrail Project. By the end of September 2012, 226 work experience opportunities had been created for 14-19 year olds.
- **Graduates** – By the end of September 2012, CRL had facilitated 115 graduate placements through working with its Main Contractors.

In addition, CRL has also established its own graduate employment programme. Eight opportunities will be created each year, which will last for two years.

Candidates have been invited to apply and those who are successful will join CRL from August 2013.

- **Jobs brokerage and new job starts** - CRL established a Jobs Brokerage Service in partnership with Job Centre Plus in March 2010. This ensures that new job opportunities are efficiently advertised, and that candidates with relevant skills can quickly be identified for new roles.

By the end of September 2012, 708 job and apprenticeship opportunities had been advertised through the Jobs Brokerage Service, of which 51% have been successfully filled.

- **Lorry Driver Induction Training (LDIT) programme** - CRL now runs its LDIT programme three times a week and has launched an online portal to provide lorry drivers refresher courses for those lorry drivers that attended the course over two years ago (see section 3 for more details)

- **Young Crossrail**

The Young Crossrail programme works with all primary and secondary schools within a one-mile radius of the Crossrail route. The programme aims to provide work and training opportunities for young people and promote careers in construction, engineering and railway infrastructure.

Young Crossrail STEM Ambassadors are employees of the Crossrail supply chain who volunteer their time to inspire young people in Science, Technology, Engineering and Mathematics (STEM) subjects.

In partnership with STEMNET (Science, Technology, Engineering and Mathematics Network), ambassadors have attended talks and events at schools close to the Crossrail route, as well as further education colleges across London and the south east.

8 Sustainability

CRL established a Sustainability Strategy in 2009. This defines the seven themes that will be applied and followed during the design and delivery of the Crossrail Project to deliver sustainability. These themes were based on and thereby complement Transport for London's sustainability framework, and are:

1. Economic progress: maximise competitiveness and productivity of economy
2. Sustainable consumption and production
3. Address climate change and energy
4. The physical environment: natural resource protection and environmental enhancement
5. Improve health, well-being and happiness
6. Protect people's safety, security and health, and

7. Promote greater equality of opportunity and social inclusion.

On 13 February 2013 CRL published its first Sustainability Report which provides a detailed overview of the activities CRL and its Main Contractors have undertaken to deliver against each of the seven sustainability themes, alongside the indicators that are being monitored to measure progress. This report can be accessed through the Crossrail website, and will be updated each year.

Highlights from the Sustainability Report include:

- **Reducing whole life resource use** - CRL has worked with the Building Research Establishment (BRE) to establish an assessment methodology for evaluating the performance of new sub-surface stations, which hitherto has not existed. The new sub-surface Crossrail stations will now be independently assessed by the BRE on the completion of their design and construction. Current indications are that CRL will achieve a 'Very Good' Building Research Establishment Environmental Assessment Methodology (BREEAM) rating.
- **Operational energy efficiency** - As reported in 2012, across a 120 year appraisal period the operation of the Crossrail network is likely to account for around 85% of the total energy consumption for Crossrail.

As noted in section 2.3.1, CRL is responsible for procuring the new Crossrail rolling stock and has therefore ensured that sustainability requirements have been included in the design of the new trains and the new Crossrail Depot at Old Oak Common.

The rolling stock procurement will specify:

- Lightweight construction: the total mass of an unladen 200m Crossrail train will be limited to a maximum weight of 350 tonnes, which is lighter than recently delivered equivalent electric rolling stock classes;
- Energy performance: Bidders will need to demonstrate that on a standardised network journey a 200m train will operate with an energy efficiency of 24 kWh per train kilometre (equating to 0.16 kWh per passenger kilometre, 55g CO₂ per passenger kilometre) - this performance is better than any other comparable London Underground metro-style rolling stock operation;
- Regenerative braking: the motors in Crossrail trains will have the ability to go into reverse as an electric brake which returns energy to the electrical grid;
- Smart control systems for heating and lighting
- Driver advisory systems: Crossrail train drivers will be guided on how to use optimal energy efficient driving techniques.

The new Crossrail Depot at old Oak Common will also be need to be designed and constructed to achieve 'Very Good' BREEAM status.

- **Using recycled content** - CRL has set a target to achieve a 15% recycled use content (by value) for materials used during the construction of Crossrail: currently CRL is exceeding this target.

- **Recycling and re-using waste materials** - As reported in 2012, CRL has targets to:
 - Recover at least 95% of clean excavated materials and aim to achieve a stretch target of 100%, and;
 - Recover at least 90% of demolition and construction waste and aim to achieve a stretch target of 95%.

By December 2012 100% of clean excavated materials, and 96% of construction waste were either re-used or recycled – thus exceeding both of CRL's stretch targets. To date over 1,000,000 tonnes of non-hazardous excavated material has now been reused or recycled

- **Celebrating art: Crossrail Art Programme** - CRL has developed a visionary art strategy: The Culture Line. This strategy will bring world-class artists together with international architecture and engineering teams to deliver a 21st century art programme for the eight new Central Section stations.

Eight of London's premier contemporary art galleries will develop a bespoke art commission for each station. In partnership with each art gallery, an internationally recognised artist will be selected to be part of the Crossrail story by participating in the largest, collaborative art commissioning process in a generation.

This strategy has already been implemented at Paddington Station in partnership with the Lisson Gallery. On 25 March a launch event will be held to unveil the artist's concept for the station and to announce the line-wide strategy. The next two stations, Farringdon and Liverpool Street, will feature partnerships with Victoria Miro Gallery and Sadie Coles Gallery.

- **Accessibility and social inclusion** - In total 29 out of the 37 Crossrail stations will have step free access from platform level to street level in both directions.

The new Central Section stations and existing London Heathrow stations have been designed to provide step-free access from street level onto Crossrail trains. Platform to platform step free interchange between Crossrail and other rail services is also being provided at most locations. On the Surface Section many stations will benefit from step-free access improvements as part of the Crossrail Project, but also through Network Rail's Access for All programme.

Toilet facilities will also be provided at 31 out of the 37 (81%) Crossrail stations to help disabled individuals, the elderly and pregnant woman travel in comfort. In 2012 CRL agreed to invest over £1m at Farringdon Station to provide for a large new sub-surface toilets facility, in light of Farringdon becoming the UK's busiest train station when the Crossrail Central Section opens in 2018.

- **Protecting and improving the local environment** - CRL and its Main Contractors have installed over 1000m of living walls using vegetation such as ivy to hoard their construction sites: the vegetation captures particulates and provides a more pleasant environment for local people.
- **Supporting the local community** - CRL Main Contractors are obliged to undertake community investment initiatives that benefit local communities living nearby CRL construction sites. Initiatives undertaken in 2012 have included:

- A regeneration project along the River Lea by Morgan Sindall, CRL's Pudding Mill Lane Portal Contractor: this has provided a new wildlife habitat to support bio-diversity along the river and in the wider local area;
- Investment in the 'Word 2012' literacy campaign by Laing O'Rourke, CRL's Farringdon Main Station works Contractor: this initiative supports local people from deprived areas of the London Borough of Islington to improve their literacy skills.

Many other initiatives have, and will continue to be undertaken across the lifetime of the Crossrail Project.