



MEDIA BRIEFING NOTE: CROSSRAIL MOCK-UP PLATFORM MODEL

Introduction:

New Crossrail stations, costing in the region of £2bn, will be constructed along the central route at Paddington, Tottenham Court Road, Bond Street, Farringdon, Liverpool Street, Whitechapel and Canary Wharf. Main construction of the central London Crossrail stations will get underway in late 2011.

Around 200 million passengers will travel on Crossrail each year. The new stations need to cope with large numbers of passengers throughout their life, be easy to navigate and have fixtures and fittings that look good, are easy to clean and are able to endure wear and tear. To create this transport legacy for London it is essential to ensure every fixture and component is fit for purpose, cost effective and built to last.

To develop and test designs for the station platforms, a life-size 'mock-up' of a below ground Crossrail platform has been created. The mock-up has been built to help Crossrail understand how the new designs for new below ground platforms will look in real life and to determine from a practical perspective whether any design modification needs to be made ahead of station construction commencing.

The mock-up will help inform final design decisions about the below ground station environment. It is critical that Crossrail gets the internal design of stations right as the new stations have been designed to last for the next one hundred years.

It will also assist Crossrail to make the right decisions concerning inclusive design features to improve services for Crossrail passengers with restricted mobility or those with visual and hearing impairments.

The mock-up will also help Crossrail establish a consistent look and feel for the new below ground platforms and stations areas, while allowing each station to retain an individual identity.

About the platform model:

Contractors VINCI have built a life-size section of a Crossrail station platform at their construction test centre in Leighton Buzzard.

The mock-up measures 20m in length, 10m in width, with a ceiling height of 5m above the platform-edge doors. It also contains a 4m long side-tunnel entrance providing entrance and exit.

The unique benefit of the mock-up is that it helps make accurate decisions on a wide range of design issues, including:

- **Lighting and acoustics** – testing the platform environment for what passengers will see and hear
- **Signage** – testing the wayfinding features to ensure navigation within the stations is easy and intuitive
- **Physical constraints** – evaluating physical constraints before integrating them into the station structure eliminates any potential hazards and de-clutters the platform. For example, displaying train information above the platform edge doors rather than hanging display screens.
- **Train design** – the model can demonstrate how the platform will be for disembarking passengers as well as those boarding the train
- **Security** – CCTV camera coverage and locations
- **Maintenance** – assessing how station maintenance will be carried out, and how easy it will be to access and replace components.
- **Cleaning** – evaluating how easily the platforms can be cleaned

How it was built:



The mock up was built to simulate a station platform tunnel measuring 10m diameter. The length was chosen at 20m with mirrors placed at each end to create the effect of a long 240m long station. All the visible finishes are imitations of the real finishes to produce an identical visual effect of a real Crossrail station.

The mock-up structure took six people 12 weeks to build the shell. The fit-out of the mock-up required 8 weeks of intensive work with six people working on site and 20 offsite to create various fittings and textures for the finished look.

The construction method selected was to use a light weight steel frame with plywood lining fixed internally.

In the platform area, the glass wall dividing the platform from the running tunnel is separately supported by a steel frame and plywood lining. The platform itself is formed of heavy plywood on a steel frame which is stable enough to support granite and terrazzo flooring.

Once the plywood and steel shell was completed the interior lining was manufactured offsite and installed by model making company 3DD. The Sprayed Concrete Lining effect visible in various places along the walls of the structure was made offsite. It was then brought to the model, cut up and stuck on like wallpaper to the plywood shell.

The glass wall with the light box above were prefabricated and installed during the fit out stage.



Cost-effective and reliable design testing:

The mock-up has been created using film set design techniques to replicate the feel of actual finishes, which are significantly cheaper than using actual construction materials:

- **Sprayed Concrete Lining** was created by spraying expanded foam onto wallpaper and cut into panels.
- **Light fittings** were made with painted plywood.
- **Real floor tiles and glass** were used but the metal work is actually **plywood coated in metal laminate** to make it look like stainless steel.
- **Lower glass plastic reinforced panels** were made using a mould, similar to boat making techniques.

The mock-up has been extremely valuable in understanding the visual and spatial effects created by the proposed combination of finishing materials and components within the platform environment.

In finalising its station designs, Crossrail is including lessons learnt from London Underground and TfL London Rail about the operation and maintenance of Tube, rail and DLR stations. This knowledge and experience will help Crossrail to improve and finalise the internal designs and layouts for Crossrail station. Based on feedback from other organisations, Crossrail is currently evaluating use of all the finishes. For example, fine-tuning the lighting, perception of reflections in the glass screens, relative light levels from advertising systems, types of preferred signage, its placement and the cladding systems.

The flooring is also under evaluation with half of the platform mock-up laid in granite and the rest in terrazzo. Visitors' experience of walking on these surfaces both here and at the live test site at Victoria Tube station will enable evaluation to identify the best suited material.



About Crossrail stations:

New Crossrail stations, costing in the region of £2bn, will be constructed along the central route at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel and Canary Wharf. Main construction of the central London Crossrail stations will get underway in late 2011.

Over the last year some of the UK's best known architects have worked with world-class engineering firms to finalise the designs for eight of the new Crossrail stations. The results are stunning, sustainable, world-class designs of which London can be proud. The new stations will take inspiration from the past and from the local area but have a fresh modern twist.

The works at Bond Street, Canary Wharf, Custom House, Farringdon, Liverpool Street, Paddington, Tottenham Court Road and Whitechapel, will be on a scale not seen since the Jubilee Line Extension opened in 1999.

Design teams for each of the Crossrail stations are as follows:

- Bond Street - WSP; John McAslan + Partners.
- Canary Wharf – Canary Wharf Group; Arup; Foster + Partners; Adamsons Associates; Gillespies; Tony Meadows Associates.
- Custom House – Arup; Atkins; Allies & Morrison;
- Farringdon – Scott Wilson; Aedas; Burns & Nice
- Liverpool Street – Mott MacDonald, Wilkinson Eyre; Urban Initiatives.
- Paddington – Scott Wilson, Weston Williamson; Gillespies.
- Tottenham Court Road – Arup; Atkins; Hawkins Brown.
- Whitechapel – Hyder; BDP.
- Line-wide identity / common architectural components – Grimshaw; Atkins; GIA Equation.

A funding agreement has now been reached with Berkeley Homes to build a station box at Woolwich.

Station contract awards:

In January 2011, Crossrail finalised the shortlist for C405 Paddington station. The following organisations were invited to tender:

- Costain Skanska JV;
- Balfour Beatty, Morgan Sindall and Vinci JV;

- BAM Nuttall, Ferrovial Agroman and Kier Construction;
- Laing O'Rourke and Strabag JV; and
- Carillion Construction Ltd

In February 2011, Crossrail announced the shortlist for C435 Farringdon station. The following organisations will be invited to tender for the main construction contract:

- Balfour Beatty, Alpine BeMo, Morgan Sindall & Vinci JV;
- Costain Skanska JV;
- Laing O'Rourke & Strabag JV; and
- BAM Nuttall, Ferrovial Agroman & Kier Construction JV.

Crossrail has started the tender process for a further four central London stations – Bond Street, Liverpool Street, Tottenham Court Road and Whitechapel. This now means that the tender process for all new Crossrail central London stations is underway. The total value of the main construction contracts for the six central London Crossrail stations is £1.5bn.

Crossrail intends to award the main construction contracts for all central London stations by the end of 2011.

Crossrail Tunnel Drives:

A total of 21 km of twin-bore tunnel is required to be constructed for Crossrail.

The five tunnel contracts already awarded comprise the following drives:

- Royal Oak to Farringdon west (Drive X) - length of drive approximately 6.2 km
- Limmo to Farringdon east (Drive Y) - length of drive approximately 8.3 km
- Stepney Green to Pudding Mill Lane (Drive Z) - length of drive approximately 2.7 km
- Limmo to Victoria Dock Portal (Drive G) - length of drive approximately 0.9 km
- Plumstead to North Woolwich (Drive H) - length of drive approximately 2.6 km

In total this will add up to 42km of bored tunnels located below the busy streets of London.

In spring 2012, the first tunnel boring machines (TBMs) will start on their journey from Royal Oak towards the west of Farringdon station. This will be followed shortly by the launch of further tunnel boring machines in Docklands that will head under central London towards the east of Farringdon.

The tunnels will weave their way between existing underground lines, sewers, utility tunnels and building foundations from station to station at depths of up to 36m.

Tunnel portals, providing access to the rail tunnels, will be constructed at Royal Oak, Pudding Mill Lane, Victoria Dock, North Woolwich and Plumstead.

Tunnelling contract awards:

In December 2010, Crossrail awarded tunnelling contracts worth in the region of £1.25 billion.

The four contract awards were as follows:

- C300 – Western Running Tunnels (Royal Oak to Farringdon)
Joint venture comprising: BAM Nuttall Ltd, Ferrovia Agroman (UK) Ltd, Kier Construction Ltd.
- C305 – Eastern Running Tunnels (Limmo Peninsula to Farringdon; Limmo Peninsula to Victoria Dock; Stepney Green to Pudding Mill Lane)
Joint venture comprising: Dragados S.A., John Sisk & Son (Holdings) Ltd.
- C410 – Early Access Shafts and Sprayed Concrete Lining Works for Bond Street and Tottenham Court Road stations tunnels
Joint venture comprising: BAM Nuttall Ltd, Ferrovia Agroman (UK) Ltd, Kier Construction Ltd.
- C510 – Early Access Shafts and Sprayed Concrete Lining Works for Whitechapel and Liverpool Street stations tunnels
Joint venture comprising: Alpine BeMo Tunnelling GmbH, Balfour Beatty Civil Engineering Ltd, Morgan Sindall (Infrastructure) plc, VINCI Construction Grands Projects.

Contracts for the Thames Tunnel construction and Connaught Tunnel refurbishment works will be awarded later this year

Supporting Skills and Employment:

As well as delivering much needed additional rail capacity, Crossrail has an important role to play in supporting regeneration and the economy as well as creating a skills legacy.

We need up to 14,000 people to work on the construction of Crossrail and in order to maximise the opportunity for people along the Crossrail route to work on the project we have three major initiatives – the Tunnelling and Underground Construction Academy (TUCA), a Crossrail apprenticeship scheme and a partnership with Jobcentre Plus.

The establishment of TUCA is central to Crossrail's delivery plans and its legacy to the industry. It is estimated that there are only 500 trained tunnellers in the UK. Demand for suitably skilled tunnelling & underground construction staff will substantially exceed supply.

TUCA is not just for Crossrail but also to facilitate delivery of future tunnelling projects in the UK and Ireland. TUCA will be the European Centre of Excellence for soft-ground tunnelling skills. Currently the nearest tunnelling training centre is Hagerbach in Switzerland, which specialises in hard rock tunnelling.

Crossrail is also committed to delivering at least 400 Apprenticeships through its supply chain over the lifetime of the project.

We have also formed a partnership with Jobcentre Plus which aims to provide local people with opportunities to work on the Crossrail project. Jobcentre Plus works with a network of local job brokerage and outreach agencies to match vacancies to suitable candidates and arrange interviews for short-listed applicants.

Tunnelling and Underground Construction Academy:

Work is progressing fast on building the Tunnelling and Underground Construction Academy.

TUCA fast facts:

- The Tunnelling and Underground Construction Academy in east London (Aldersbrook Sidings near Ilford) will start to offer training in spring 2011 and be fully open by the summer. TUCA is located at Aldersbrook Sidings on the border of Newham and Redbridge; Newham being one of the top 5% most deprived boroughs in England.
- TUCA will provide training on the key skills required to work in tunnel excavation and underground construction and aims to address the shortage of people with the necessary skills to work on Crossrail and other tunnelling projects across the UK.
- TUCA will offer training to at least 3,500 people in underground construction alone over the lifetime of the project. Currently the nearest known tunnelling training centre is in Switzerland.
- TUCA will be a specialist UK training facility for tunnelling skills and will be used by the construction industry not just for Crossrail but for other UK and Ireland tunnelling projects.
- Following the completion of Crossrail the academy will remain providing a lasting legacy for London and the UK construction industry. TUCA will be operated as an independent organisation once the Crossrail construction is complete and become a long-term provider of tunnelling skills to the construction industry.
- The volume of tunnelling and underground construction work taking place in the Capital over the next decade is unprecedented with the Thames Tideway Tunnel, National Grid and EDF electricity cable tunnels all requiring significant numbers of skilled people. Longer term, tunnelling skills would be required for Crossrail 2 and High Speed 2.

**Crossrail Press Office
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