

Board

Date: 8 February 2016

Item: Crossrail Transition Update

This paper will be considered in public

1 Summary

- 1.1 Following the initial Crossrail Transition paper to the December Board this paper updates on progress in terms of staged opening of the operational railway as well as transition of the Crossrail project to become an integral part of TfL, as the Elizabeth line.
- 1.2 Greater detail in respect of the progress of construction activities Crossrail is covered by the reports on Sponsor Board Proceedings, the next of which will be presented to the Programmes and Investment Committee in March 2017.
- 1.3 Supporting maps, diagrams and photographs are included in Appendix 1

2 Recommendation

- 2.1 **The Board is asked to note current progress and plans.**

3 Background

- 3.1 Construction is being undertaken by Crossrail Limited, a wholly owned subsidiary of TfL, sponsored jointly by TfL and the Department for Transport. TfL is responsible for buying the rolling stock for the new railway. Once completed, the infrastructure will be passed to TfL for operation and maintenance.
- 3.2 Overall, construction is now over 80 per cent complete, with over 37km of track in place. The major activities currently underway include the fitting out of stations, design and installation of the mechanical and electrical systems, including ventilation, lifts and escalators as well as power and signalling systems.
- 3.3 Day to day operation of the train services is the responsibility of TfL's operator, MTR Crossrail, who hold an eight year concession, which commenced in May 2015 with the operation of trains on the existing railway between Liverpool St and Shenfield. These services are currently branded as 'TfL Rail' in advance of renaming as the Elizabeth line in December 2018.
- 3.4 In recent months TfL Rail has been amongst the most reliable of any of the national train operators. In Period 10 96.2 per cent of trains met the Public Performance Measure (PPM), the top performance in the country.

4 Phased Opening

- 4.1 Crossrail remains on schedule to open, as planned, in five stages. A staged approach allows the various parts of the railway to be brought into service and demonstrate reliable operation before the new trains, operations on surface sections and in tunnels are all brought together in 2019. The stages are shown diagrammatically in Appendix 1.
- 4.2 The first phase (Stage 1) is the introduction of the first of the new Class 345 trains to run between Liverpool Street and Shenfield from May 2017. Over the course of 2017 the majority of services on TfL Rail will move to being operated by new trains, although some of the older (Class 315) trains will remain in service through to 2019.
- 4.3 The initial Class 345 are 160m long. They have full air conditioning, walk through carriages, a mix of longitudinal and bay seating and four dedicated spaces for wheelchairs. They will have CCTV, public address systems and modern (LCD) customer information displays. Once tunnel operations commence in December 2018, trains will be 200m long and will enable 4G and wi-fi communications. An invitation has been extended to Board members to visit the factory at Derby and view the trains in production.
- 4.4 On 9 December 2016, the first Class 345 was delivered to Ilford Depot and night time testing on Network Rail tracks between Liverpool St and Shenfield is now underway. In addition to the train at Ilford, five further units have been completed and are undergoing testing elsewhere. One, at Network Rail's (NR's) test track at Melton in Leicestershire has now completed over 8,000km of running.
- 4.5 The most critical part of the construction and introduction of new trains are the multiple on-board systems and the complex software that integrates them. Several further software releases are planned between now and introduction of the new trains in May 2017.
- 4.6 To support successful introduction of the first train into passenger service in May 2017, there are still works to be completed at Ilford Depot as well as work by NR to adjust platform edges and provide equipment at stations on the route. Up to 3000m of platform edges require adjustment so they are not too close, or too far away from, the new trains. A significant amount of work was undertaken over Christmas and the remaining works are programmed to take place between now and March, with the railway closed on several weekends as work to platforms cannot safely be completed with trains running.
- 4.7 Stage 2 of phased opening in May 2018 is operation of four trains per hour between Paddington and Heathrow using the existing tracks. These services will replace the current two trains per hour Heathrow Connect trains, operating to Terminals 2/3 and Terminal 4. Heathrow Express services will continue to operate to Terminals 2/3 and 5 and do not change.
- 4.8 For Stage 2 services the new Class 345 train needs to be upgraded to operate with European Train Control System (ETCS) signalling, as the tracks between Heathrow and Stockley (where trains join the current Great Western Main Line) will be some of the first in the UK to be fitted with this system. NR is fitting the system to the 'wayside' (track) and Bombardier, as manufacturer of the new

trains, is fitting the equipment required on the train, which need to be integrated and tested in the second half of 2017. Between Stockley and Paddington trains will use the existing signalling systems.

- 4.9 In a similar manner to Stage 1, Stage 2 requires work to the tracks and stations. Significant and successful work to track and signalling was undertaken by NR over Christmas 2016 but there are extensive works yet to be undertaken, including adjustment of platform heights, to allow successful introduction of the new trains to the route.
- 4.10 The main maintenance depot for the trains is at Old Oak Common, where Vinci is constructing the depot under contract to Bombardier who will maintain the fleet following introduction. Maintenance will utilise advanced inspection, sensing and diagnostic equipment designed to allow more accurate maintenance interventions and hence greater reliability and efficiency than using more traditional, time or distance based techniques.
- 4.11 The principal maintenance building at Old Oak Common is now structurally complete and being fitted out with systems and equipment and track laying for the sidings is underway. The first section of the depot is planned to be ready in the Autumn to receive the trains that will operate to and from Heathrow from May 2018.
- 4.12 Finally, with respect to Stage 2, track access agreements need to be in place to operate on the Heathrow branch. Heathrow Airport Limited (HAL) continue to seek Judicial Review of elements of the Office of Rail and Road's (ORR) decision on charges for railway track access. The hearing is scheduled for late February 2017.
- 4.13 Further details of operational readiness and plans for service introduction for Stages 3, 4 and 5 will be included in future updates but in summary:
 - (a) In December 2018 (Stage 3) services commence in the Crossrail central tunnel, operating between Paddington (new underground platforms) and Abbey Wood, via the West End, City and Canary Wharf. Services on the existing railway between Shenfield and Liverpool Street and Paddington and Heathrow continue to operate separately. From this date services will be referred to as the Elizabeth line.
 - (b) In May 2019 (Stage 4) Shenfield to Liverpool Street services are connected into the central tunnel section to run as far as Paddington. Services between Paddington and Heathrow continue to operate separately.
 - (c) Finally, in December 2019 services from the West are connected into the central tunnel and trains are extended in the West to Maidenhead and Reading. This is the final phase (Stage 5) of Elizabeth line service introduction.
- 4.14 As noted (1.2 above), the detailed progress of the Crossrail Project works is reported to the Programmes and Investment Committee through the Report on Sponsor Board proceedings, with the next report scheduled for the meeting in March 2017.

5 Elizabeth line Service Frequencies and Patterns

- 5.1 TfL continues to examine the case for higher frequencies off peak, more Elizabeth line services to Reading and the possibility of serving Heathrow Terminal 5.

6 Stations

- 6.1 The Elizabeth line will serve forty stations of which ten are new stations, or major new additions to existing stations and the remainder existing national rail stations on the surface sections of the railway. All stations will be step free from street to platform and the ten central section and the Heathrow stations will have level boarding.
- 6.2 The remaining thirty stations which the Elizabeth line will serve range from major termini such as Reading, through stations which will be substantially rebuilt (including Ilford, Ealing Broadway, Southall, Hayes and Harlington) through to smaller stations (Iver, Taplow).
- 6.3 NR is undertaking many of the station rebuilds and upgrading as part of its On Network Works (ONW). Work at stations to the east of London is planned to be largely complete this year, with the exceptions of Ilford (which received planning approval in December 2016) and Romford. Works at Ilford and Romford will be completed in 2018/19. To the west of London station rebuilds and refurbishment under ONW are scheduled for completion between 2017 and 2019.
- 6.4 TfL sponsored works are now underway to provide step free access at seven stations, where step free access was not mandated in the 2008 Crossrail Bill. Significant progress in respect of foundation works was made over the Christmas at Seven Kings, Manor Park and Maryland and these schemes are due to complete in the autumn. In the west, designs are being completed for step free works at Hanwell, Iver, Langley and Taplow. Work on site will commence in 2018 with the completion by the time full Elizabeth line services operate in the west at the end of 2019.
- 6.5 Work to refurbish various passenger facilities at Manor Park, Seven Kings, and Ilford (York Road) are now complete and works at Chadwell Heath and Brentwood are currently underway. Pictures of some of the step free plans and completed station refurbishment works are included in Appendix 1.

7 Crossrail Transition and Integration Programme

- 7.1 Whilst the Crossrail Project is being delivered by Crossrail Limited (CRL), sponsored jointly by TfL and the Department for Transport (DfT), the operation of the Elizabeth line services is the responsibility of TfL. As the project moves towards its operational phase, arrangements are already being put in place to manage the transition of responsibilities from CRL to TfL.
- 7.2 CRL will hand over elements of the new infrastructure to TfL in the summer of 2018, in advance of the start of services in the central tunnel in December 2018. The number of people employed by CRL will reduce substantially from 2018. By

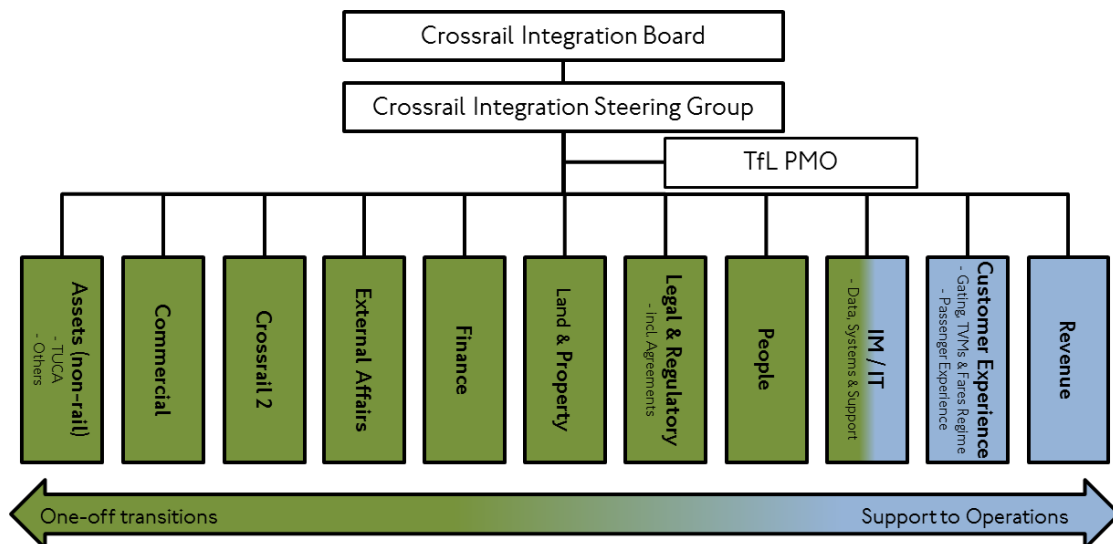
2019 virtually all of CRL's functions will have ceased or transitioned to business as usual within TfL.

7.3 As noted in the paper to the Board in December 2016, a Transition and Integration Programme and has been established, managed by a Steering Group of senior TfL and CRL managers. It reports to the Crossrail Integration Board, which comprises the Managing Directors LU, Finance and HR and the Chief Executive of CRL.

7.4 The aims of this programme are to:

- (a) ensure the project is supported, protected, closed and integrated successfully; and
- (b) transfer talent, knowledge and processes for the benefit of TfL and Crossrail 2.

7.5 The programme consists of a number of workstreams, focused on the key areas of transition from CRL to TfL.



7.6 Since the last update to the Board in December 2016:

- (a) TfL has taken over responsibility for operation of the Tunnelling and Underground Construction Academy (TUCA) at Ilford, where more than sixteen thousand contractors and apprentices have received training. TUCA will continue to provide training in tunnelling and construction as well as being the centre for operational and maintenance training for staff delivering Elizabeth line services.
- (b) The Commissioner hosted an event at TfL's Victoria Station Upgrade Project on 30 November 2016 where senior Crossrail staff had the chance to explore how their skills might be used on TfL projects once the roles at CRL are complete. The process for staff within CRL to move to TfL is made more complex by the transformation of many of the equivalent departments within TfL itself.

- (c) The Crossrail Joint Sponsor Team is continuing to keep revenue forecasts under regular review in the light the significance of the Elizabeth line, in terms of revenues, to the overall TfL Business Plan.

8 Conclusion

- 8.1 The Elizabeth line is on course to open as planned, in stages between May 2017 and December 2019. The physical project is now over 80 per cent complete and the new Class 345 trains are now being tested. TfL continues to work with its co-sponsor, DfT, to examine ways to improve and increase services to maximise the benefits of the new railway to Londoners.
- 8.2 TfL and CRL continue with a structured programme to support and protect CRL project delivery and identify and mitigate the risks of transition into TfL.

List of appendices to this report:

Appendix 1 (Maps and Pictures)

List of Background Papers:

None

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Appendix 1 – Supporting Information

Howard Smith – Operations Director, Crossrail



Geographical Route Map



Route Map

Showing Infrastructure Managers

- Network Rail (Great Western and Heathrow Extension)
- RfE Croxall (Central Operating Section)
- Network Rail (Great Eastern)
- MTR Croxall
- MTR Croxall / London Underground
- London Underground
- Other IM
- Bombardier (Old Oak Common Depot)
- ⤵ Portal (tunnel entrance and exit)



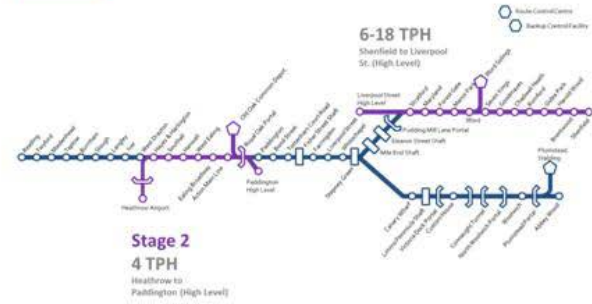
Staged Opening Diagrams

2017 Q2 Stage 1



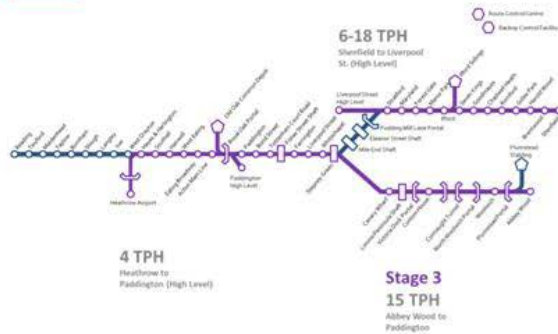
New Rolling Stock on Great Eastern surface section

2018 Q2 Stage 2



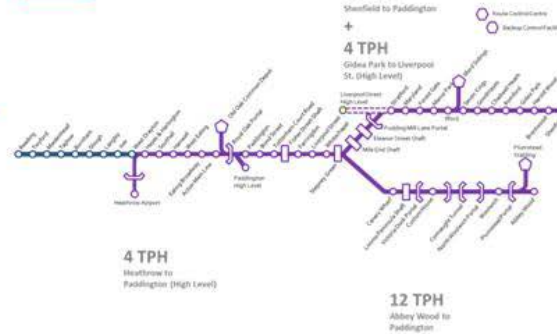
New Rolling Stock on Great Western surface section to Heathrow

2018 Q4 Stage 3



Trains run through central section:
Paddington to Abbey Wood

2019 Q2 Stage 4



Central Section service connected to
Great Eastern surface section

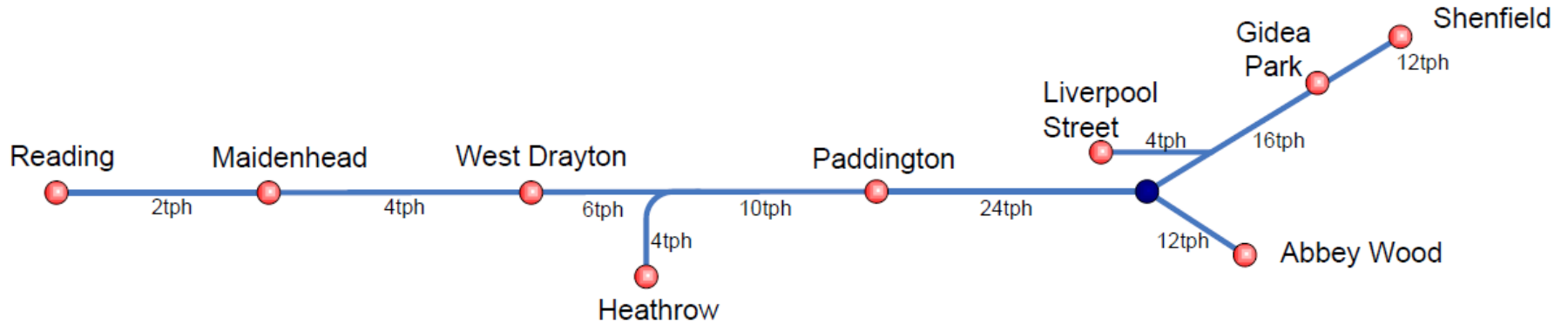
2019 Q4 Stage 5



Central Section service connected to Great Western surface section.
Passenger services operational from Maidenhead and Heathrow to Shenfield and Abbey Wood



Service Frequency at Full Opening (Dec 2019)



Class 345 Test Train Arriving at Ilford Depot



Manor Park & Seven Kings Step-Free Plans



Manor Park



Seven Kings



Station Refurbishments & Enhanced Passenger Information

‘Wonderwall’

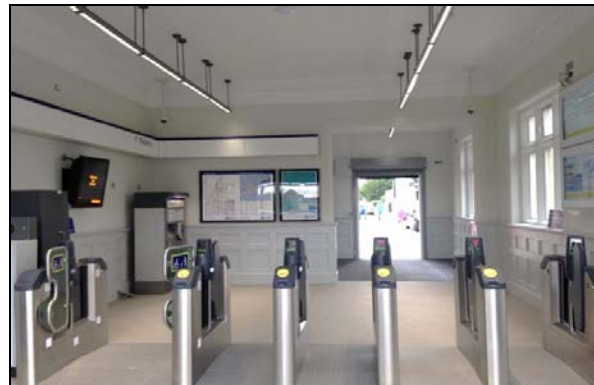
Seven Kings – External clean & repair



Ilford York Road – New station entrance



Manor Park - Interior & gating



Ilford York Road – New entrance & gating

Westbound Towards Central London		Eastbound Towards Shenfield	
Service	Arrival P/From	Service	Arrival P/From
London Liverpool S...	17 mins 1	Shenfield	due 2
Calling at: Liverpool Street		Calling at: idwell Heath, Romford, Gidea Pa	
London Liverpool S...	20 mins 1	Shenfield	10 mins 2
Calling at: idon, London Liverpool Street		Calling at: idwell Heath, Romford, Gidea Pa	

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Information		Local buses	
Piccadilly	Minor Delays	Towards Leytonstone or Wanstead A	
TfL Rail	Good Service	Towards East Ham or Ilford B	
Jubilee	Good Service	101	Wanstead due A
Central	Good Service	W19	Walthamstow 1 min A
Overground	Good Service	104	Stratford 4 mins B
DLR	Good Service	e Saturday 5 & Sunday 6 December between Aldgate East and Dagenham	
Circle	Good Service		
Hammersmith & City	Good Service		
Metropolitan	Good Service		
Bakerloo	Good Service		
District	Good Service		
Northern	Good Service		
Victoria	Good Service		
Waterloo & City	Good Service		

