

TRANSPORT FOR LONDON

BRIEFING NOTE

Subject: Weekly Mayoral update on Crossrail / Elizabeth line

Date: 19 March 2018

Manifesto commitment(s)

Not applicable

Draft Mayor's Transport Strategy (MTS)

A good public transport experience

Proposal 57: The Mayor, through TfL, will work with the DfT to open the Elizabeth line in 2019, with services initially providing 24 trains per hour through central London and increasing in frequency during the 2020s as demand requires.

1 Purpose

- 1.1 Weekly update to the Mayor outlining progress and challenges ahead of the launch of the Elizabeth line.
- 1.2 The Mayor is asked to **NOTE** this briefing.

2 Headlines

- 2.1 Testing of the new trains and infrastructure in the westbound tunnel between Abbey Wood and Stepney Green continued last week and testing in the eastbound tunnel commences this week.
- 2.2 A detailed meeting with Alstom TSO Costain (ATC) joint venture will take place this week following the Executive level meeting held on 9 March. CRL will continue to apply pressure to secure ATC's commitment to the dates in Crossrail's Master Operational Handover Schedule that delivers the Elizabeth line on 9 December 2018.
- 2.3 In addition, there are important meetings involving Bombardier Transportation, Siemens, ATC and CRL this week to ensure that these contractors' plans are fully integrated with each other as dynamic testing progresses and the testing and commissioning of systems occurs.
- 2.4 Platform screen door installation is nearing completion with only three platforms remaining (Tottenham Court Road, Liverpool Street and Whitechapel). The 120m long glass canopy at Paddington, is now complete.

3 Costs

- 3.1 CRL's costs are reported on a periodic basis and remain unchanged at £12,464m.
- 3.2 Discussions took place between CRL and Sponsors (DfT and TfL) at the Crossrail Sponsor Board on 22 February, regarding the likelihood of additional funding being



required to complete the project. CRL's current forecast (3 February) continues to show £48m headroom to the limit of the £600m contingency, funded by TfL.

- 3.3 Scenario analysis presented by CRL indicates that the likelihood of their cost forecast breaching that limit by the time of the next formal report (May) is high as they incorporate the implications of the revised Master Operating Handover Schedule (MOHS), delays to energisation, revised Bombardier programme, and current levels of productivity on the systemwide contracts.
- 3.4 A deep dive into Crossrail / Elizabeth line readiness with TfL Board members is scheduled for 20 March where funding and the delivery schedule will be reviewed.

4 Programme and Schedule

- 4.1 The key commitments and dates in Crossrail's Master Operational Handover Schedule (MOHS) 2018 are provided in the appendix A.

5 Industrial relations

- 5.1 Unite the Union and Balfour Beatty have reached an agreement that resolves the dispute involving Balfour Beatty electricians working at Woolwich.
- 5.2 The agreement involves, amongst other small items, a modest increase in the monthly bonus received by the electrical workforce.
- 5.3 The impact of this deal on other sites will be closely monitored.

6 Appendix

- **Appendix A:** Key milestones from MOHS 2018 schedule
- **Appendix B:** Table of key risks and issues
- **Appendix C:** List of Acronyms
- **Appendix D:** Bombardier update



Appendix A: Key milestones from MOHS 2018 schedule

MOHS Milestones	MOHS2018 date	Status
Traction power Zones 1&2	Feb 18	Achieved
Dynamic testing Zones 1&2	Feb 18	Achieved
Traction power on Zones 3&4	May 18	
High Voltage Non Traction Power Zones 1&2	May 18	
Stage 2 commencement (contingency plan)	May 18	
Dynamic testing Zones 3&4	Jun 18	
Network Rail award west station contract	Jun 18	
Handover of stations and elements to RfL and LU	Jun-Nov	
High Voltage Non Traction Power All locations	Jul 18	
Dynamic testing all zones	Jul 18	
Trial running commences	Aug 18	
Safety case for central section submitted to RAB C	Aug 18	
Trial operations commence	Sep 18	
Submit Approval to Place Into Service to ORR	Sep 18	
Full Stage 2 services	Tbc	
Stage 3 commencement	9 December 18	



Appendix C: Table of key risks and issues

Risk / Issue	Key date	Mitigation / Action
Stage 2 - Paddington to Heathrow, Shenfield to Liverpool Street mainline		
Timely completion of ETCS testing and BT on board signalling approval	On-train testing start 4 May 2018	Heathrow testing restarted 23 Feb 2018 Further release of software 7.3 is likely to be required for passenger service
Stage 3 - 9 December 2018 - Abbey Wood to Paddington, Heathrow to Paddington mainline, Shenfield to Liverpool Street mainline		
Timely provision of design assurance information, asset data, key operations/ maintenance information.	Systemwide Handover 5 Aug 2018	Maintain improved design assurance close out rate and drive Tier I contractors to provide relevant information in good time.
Risk of delays to the Bombardier schedule for installation of the Class 345 on-board TCMS / CBTC (v 6.1.1 & v7) impacts activities for Dynamic Testing.	CBTC Authorised for Trial Running 22Jun18	Prioritisation of software development & testing for Stage 3 in latest BT programme. The revised plans includes contingency to start of testing in central section
Risk of delays to commissioning of NR interfaces impacting trial running.	Commence Transition Testing Z1&2 30Jun18 Z3&4 14Jul18	Confirm and maintain blockades. Confirm the programme for installation of wayside equipment, on board software and testing at PML.
Risk of insufficient time to undertake trial operations activity.	Trial Ops 09 Sept 2018	CRL continues to work with contractors on resourcing and prioritisation of key information.
Risk of LU readiness being impacted by ongoing construction at stations, spares availability and completion of staff training.	Trial Ops 09 Sept 2018	Station by station Handover execution plans being agreed between CRL and LU.
Preferred delivery option and programme for wifi and 4G for passengers from stage opening and maintenance teams from handover.	Wi-Fi for passengers 9 Dec 2018	Interim on-train wifi solution proposed. Positive initial engagement with MNOs with procurement planned for Mar 18



Appendix D: List of Acronyms

Acronym	Description
ATC	Alstom, TSO, Costain joint venture
BT	Bombardier Transportation
CBTC	Communications Based Train Control
CRL	Crossrail Limited
DfT	Department for Transport
ETCS	European Train Control System
LU	London Underground
MNO	Mobile Network Operators
MOHS	Master Operating Handover Schedule
MTS	Mayor's Transport Strategy
ORR	Office of Rail & Road
PML	Pudding Mill Lane
RAB (C)	RfL Assurance Board for Crossrail
RfL	Rail for London
TBC	to be confirmed
TCMS	Train Control Management System
TfL	Transport for London
TPH	Trains per hour



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Key Activities and Issues

- 40 trains have been completed in Derby by Bombardier, which is in line with plan.
- 13 (out of 15) 7-Car trains are based in Ilford and available for service on the Shenfield line.
- Driver training on the Great Western has continued ahead of Stage 2 services between Paddington and Hayes and Harlington/Heathrow in May 2018. This is in line with the plan.
- Dynamic Testing in the Crossrail tunnels restarted on 11 March and a number of runs have been completed using the westbound tunnel between Abbey Wood and Stepney Green.
- Approvals to support the start of testing of the automatic operation of the train in the Crossrail tunnel were submitted by Bombardier on 16 March on schedule. These are now being reviewed and incorporated into the overall safety submission for testing of automatic operation in the tunnel. Assurance submissions have to remain a key area of focus.
- The next Stage of Old Oak Common Depot (Stage B1 – comprising 6 additional sidings) is due to be brought into use on 11 April. This remains on plan.
- Bombardier continues to test the latest release (7.1) of the train management software on the test rig at Derby and the test track at Melton. The release was on time but a number of bugs exist. Bombardier is identifying extra resources to work on the next release (7.2) which is currently being developed and will be certified for Stage 3 passenger operations later in the year. The speed of defect rectification remains key to the success of Stage 3 operations.
- As reported last week, Bombardier has confirmed new, later dates for the release and approvals of the software that will support the new Elizabeth line trains travelling through the tunnel between Hayes & Harlington and Heathrow airport. These delays will protect the programme to deliver Elizabeth line Stage 3 services (the central tunnel section) by prioritising software fixes

needed for Stage 3 at the expense of requiring a further, later, software release to address Stage 2 issues. This will have an impact on the start of full Heathrow services using new Elizabeth line trains. TfL Rail is still on plan to take over the Heathrow Connect services in May 2018, using the existing rolling stock where necessary.

- The next pre-testing of the European Train Control System ('ETCS') in the Heathrow tunnels is scheduled for 23 March. In addition, laboratory testing is about to start in Charleroi Belgium allowing some ETCS tests to take place without requiring access to the actual railway at Heathrow.

Key Programme Milestones

Stage 2	P80 Programme (V3_5_1) 11 th Jan	Current Forecast
Approval for driver training on Great Western routes excluding European Train Control System	27 Feb	Submitted 5 March
Approval for European Train Control System driver training on Great Western	24 Aug	12 Oct
Approvals for European Train Control System Passenger Service	28 Sept	19 Nov
Stage 3		
Completion of Transition testing at Melton ready for Central Operating Section Dynamic Testing	29 Jan	Complete
Approval of CBTC signalling for Central Operating Section Trial Operations	22 Jun	22 Jun
Availability of 22 trains for Trial Running in the Central Operating Section	13 Aug	13 Aug
Approval of Class 345 for Stage 3 Passenger Service	10 Oct	10 Oct
Start of Stage 3 Passenger Service	9 Dec	9 Dec
Old Oak Common Depot		
Section A Brought into Use	1 Mar	Complete
Section B1 Brought into Use	11 Apr	11 Apr
Section C Brought into Use	30 May	30 May