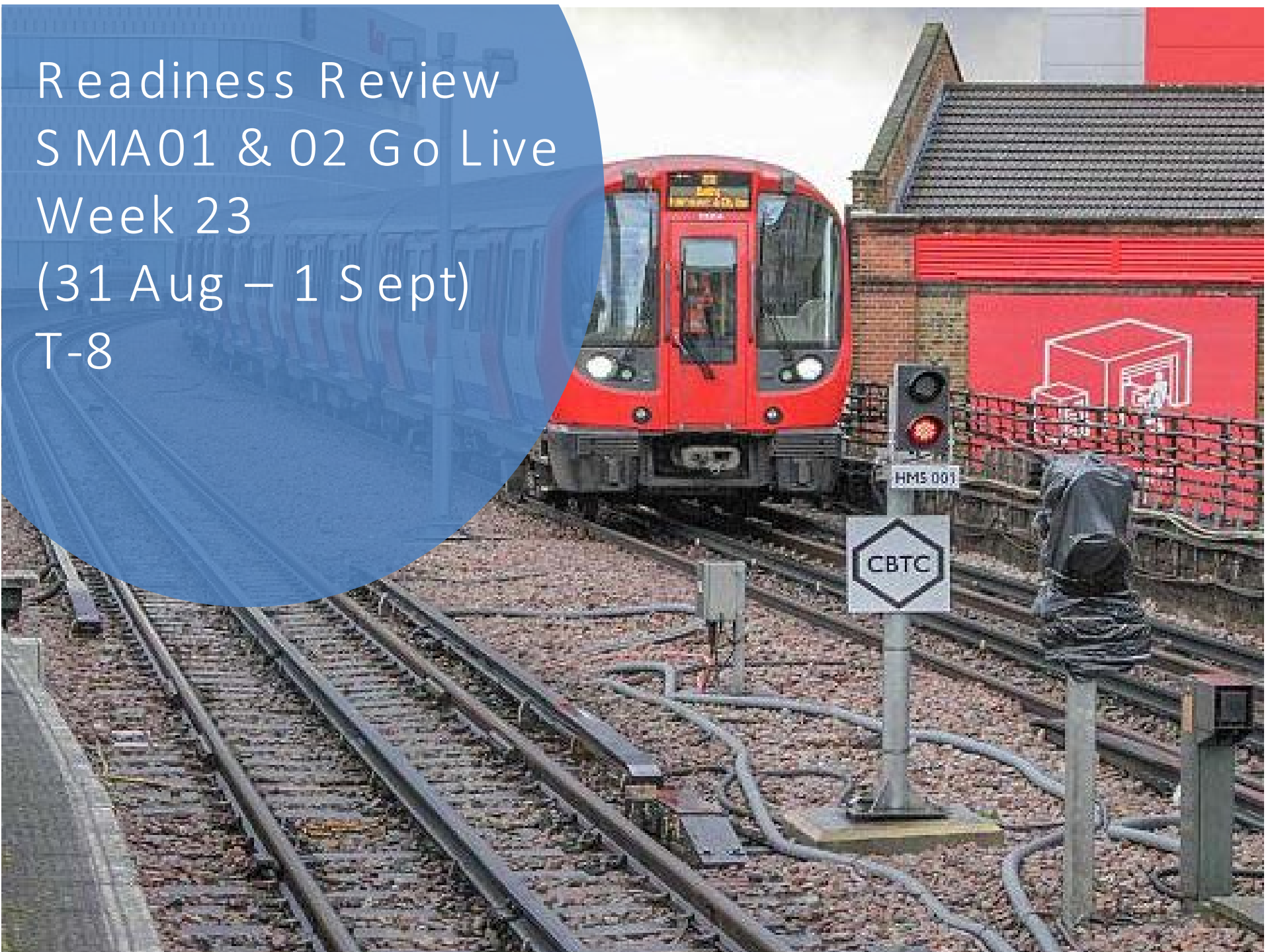
Readiness Review
SMA01 & 02 Go Live
Week 23
(31 Aug – 1 Sept)
T-8



Agenda

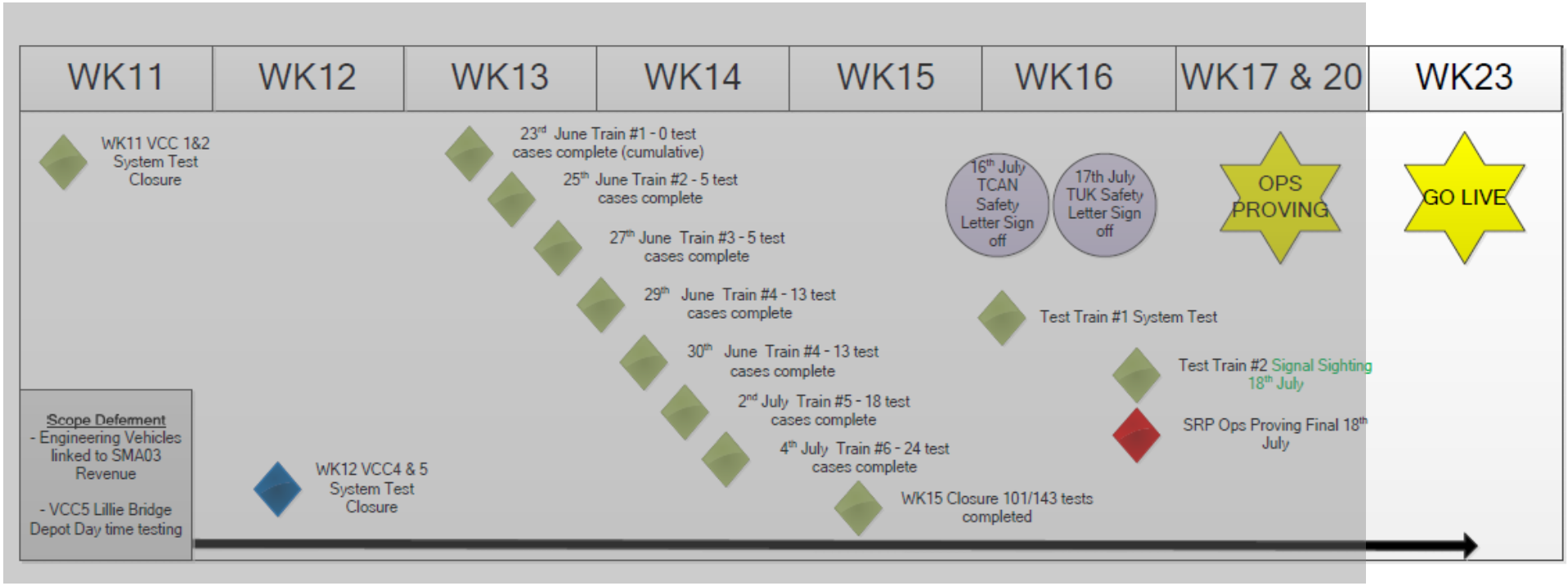
Item	Topic	Lead
	Welcome and Introductions	Chair
1	Road to Go Live	Joe Little
2	Week 20 Summary	Sam Etchell
3	Software Configuration	Sam Etchell
4	SRP Timeline	Anjay Raj
5	Fleet Health and Configuration	Lee Druery
6	OR/IS List and Impact	Sam Etchell
7	Reliability To Date and Forecast	Sam Etchell
8	Operations Readiness & KPI's	Graham White
9	Maintenance Readiness	Ricky Taylor
10	Ops Proving Support	Ricky Taylor
11	Any other issues affecting Ops Proving	All
12	OR Extra Information	Sam Etchell
13	Reliability Predictions following Operational Proving II Extra Information	Sam Etchell

Welcome and Introductions

1. Road to Go Live
(Joe Little)

UNDERGROUND
EVERY JOURNEY MATTERS

Road to Operational Proving



2. Week 20 Summary (Sam Etchell)

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SMA1/2 Operational Proving #2
Technical Observations

- VCC1 and VCC2 running 4.13.28 (and associated subsystems at 4.13.20+ baseline)
- Mixed VOBC fleet with 4.13.00 and 4.13.21 VOBC
- Non software changes implemented following #1 (Entry TSR /BSS T1 tag /TSR smooth etc)
- ERD P3 brought back into use
- The following issues were observed:

Area	Description	Status
Workstations	Halt during timetable edit	SMC 4.13.28 patch 3
SWS – FRD ISP	Speed violations (TSR /PSR)	Potential further TSR smoothing
	CZFRD2 reservations	IS110 raised
	EB after stopping short at ISP	IS110 raised
FRD1	Idle trains at FRD1 allows other trains to route past FRD ISP2	OR133 raised
BSS reservations	Trains routed to BSS ISP1 reserve BSS junction – with GPS closed	IS100 raised
Migration entry VOBC	Single VOBC due to tag reads (same operational proving #1)	4.13.21
	NCT trains at PAD	4.13.21 and TSR (15mph) planned
	Invalid coupler status	4.13.21 and IS101 raised
	Failure to recover single VOBC	4.13.21 and IS101 raised
MLCS alarms	Unnecessary 'wrong run' alarms based on MLCC extra trip matching	IS102 raised

3. Software Configuration (Sam Etchell)

UNDERGROUND
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SMA1/2 Trials Ops #2 - configuration

System	Version	New
VCC1	4.13.28	N
VCC2	4.13.28	N
VOBC	4.13.00 & 4.13.21	N *see note 1
SCS	4.13.25	N
SMC	4.13.28 plus patch 2 and patch 3	Y *see note 2
DCS	R20 (ECN/FCB of R19.1 to R19.6)	N
Tags	Updated Xover co-ordinates (BSS3)	N

1. Legacy TSR did not fully mitigate the issue at migration entry and further compatibility issue observed with single VOBC recovery
   - Expediting rollout of 4.13.21 to the S7 fleet

2. Two patches being applied to SMC 4.13.28
   - Patch 2 defined and agreed prior to Operational Proving #2
   - Patch 3 as a result of issues seen during Operational Proving #2

4. SRP Timeline (Anjay Raj)

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SRP Timeline

- **27th August:**

Final SRP, with all approvals targeted for sign-off at this SRP. Any outstanding approvals aiming to be delegated to Lead Accredited Assurer. By exception they would need to brought back to a Contingency SRP.

- **29th August:**

Contingency SRP, for any remaining open items that require panel endorsement that cannot otherwise be delegated.

5. Fleet Health and Configuration (Lee Druery)

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Trains Health

	13/08/2019		20/08/2019		
S Stock Trains in London	S7	S8	**S7**	**S8**	Comments
ATC Fitted	133	59	133	59	Fitted trains in London
Revenue Config Ready	114	57	114	58	Restricted by how many trains are at the correct BT & Thales configuration
Revenue Ready & Tested	97	57	98	58	Restricted by how many trains have ran in London / passed DCA SIM testing
Certified for ATC Service	96	57	97	58	Restricted by how many trains have Thales Master Train Certificate (S7:103 & S8:59)
Offered for ATC Service *	95	57	95	58	Restricted by how many trains are CBTC Flagged in TOMAS

- All 59 S8 trains now in Rev 7 commissioning report, including T70 (S7+1)
- One S8 train (T4) yet to load VOBC 4.13.21 sw due to no access to the train (currently lifted).
- S7s offered for ATC Service currently has 17 trains on stop, of which 1 has an ATC fault.
- S8s offered for ATC Service currently has 7 trains on stop, of which 0 have an ATC fault.
- S7 software and certification to progress following SMA1/2 Go Live.

6. OR/IS List and Impact (Sam Etchell)

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OR Peer Review – Revenue Summary Position

- To date the Operating Rules have been presented as a binary number in the below format
- The below table defines the final and agreed numbers with regard to Operating Restrictions for SMA1/2 revenue service.
- This peer review will provide a more focussed and less binary review of the numbers for the 4 key discipline areas.

Discipline Area	SMA 1/2	
	ORs	ISs
Maintenance – Signalling	40 (7)	31 (3)
Ops - Service Control	35 (6)	34 (3)
Ops - Train Operators	7 (1)	14 (0)
Maintenance – Fleet	9 (0)	11 (0)
Transplant	1 (0)	0 (0)
Overall Total	43 (7)	37 (3)

OR Peer Review – Overall Summary

Summary of #s

Discipline Area	#
Maintenance – Signalling	47
Ops - Service Control	41
Ops - Train Operators	8
Maintenance – Fleet	9
Overall Total	50

Summary of indv. Rating (2 x ORs)

Status	Train Ops	Sig	Fleet	Service Control
2,3,4 (low)	6	12	2	15
5,6 (medium)	1	4	0	21
7,8,9 (High)	0	2	0	4

Agreed peer review status:

Agreed peer review notes:

7. Reliability To Date and Forecast (Sam Etchell)

UNDERGROUND
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SMA1/2 Revenue Service – Engineering Reliability Predictions

	Ops Proving I (20/21-July)	Ops Proving II (10/11-August)	Go Live (pro-rata-ed from Ops Proving II)	Mitigated prediction at go live (per day)	Mitigated prediction +2 weeks and 4.12.21 rollout
# incidents	50	37	N/A		
# SAFs	38	19	26		
# technical	29	14	24	**10** (next slide)	**3** (next slide)
# people	9	5	8	Not analysed	Not analysed

- With the exception of migration entry issues none of the SAFs from Ops Proving #1 were seen again
- Of the 14 technical SAFs in Ops Proving #2 the following conclusions have been drawn:
  - 4 SAFs : associated with 4.13.00 incompatibility, resolved when 4.13.21 rolled out to the S7 fleet.
  - 1 SAF : slip / slide due to confusion on use of ACAAT. Resolved for revenue service (ACAAT in use)
  - 1 SAF : associated with random VOBC DCU (radio) failure, not resolved but S7 fleet (with same component) has not seen this failure. Not expected to be repeated frequently and covered by existing predictions.
  - 1 SAF : no logs available but associated with single VOBC so not expected to be service affecting under normal circumstances.
  - 7 SAFs : BSS to FRD, covered by ORs. Not expected to be frequent but are not resolved and requires compliance to OR to mitigate / minimise impact. Potential to reoccur.

8. Operations Readiness & KPI's (Graham White)

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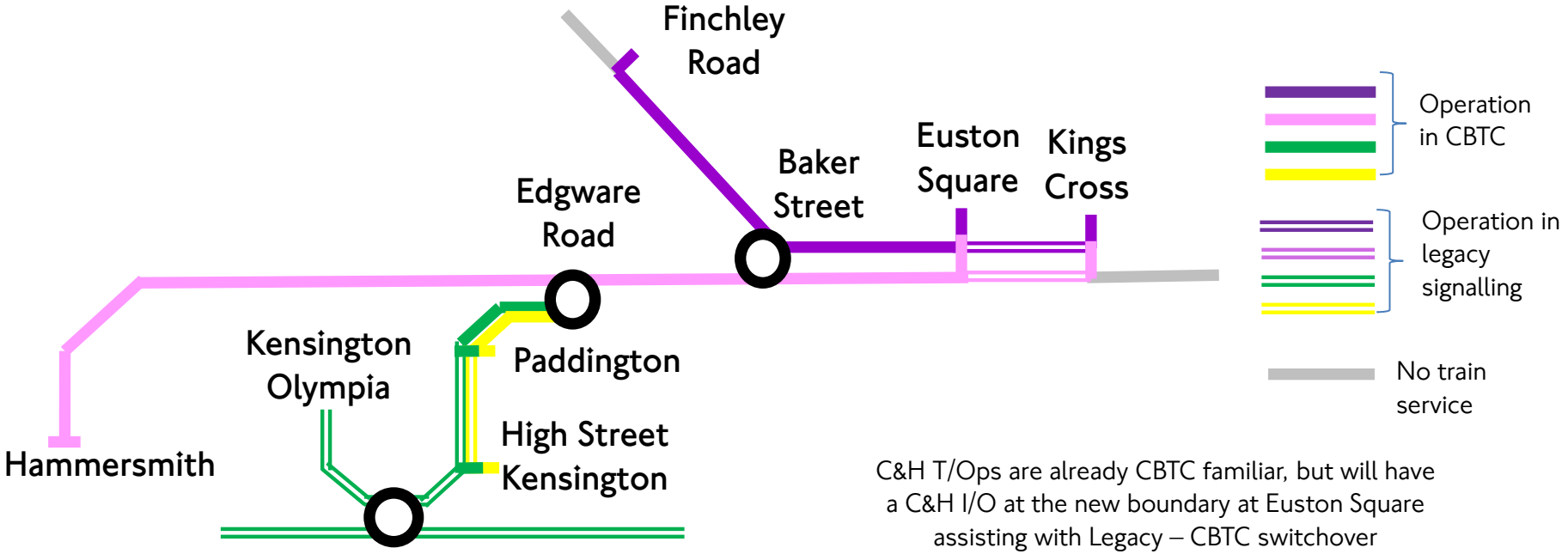
Train Operator Familiarisation activity



C&H T/Ops are already CBTC familiar, but will have a C&H I/O at the new boundary at Euston Square assisting with Legacy – CBTC switchover

- Met and District line T/Ops will see CBTC for the first time at SMA 1 / 2
- They will have the same Familiarisation chain as the C&H did at SMA 0.5:
  - Test Train Operators → Instructor Operators → Upgrade Backfill Pool / Normal T/Ops

- Familiarisation trains will shuttle through the area. These trains are largely self-contained from the rest of the service.

- The agreed process is that they will do 3 round trips each through the area (they can sign off earlier if confident)
- Aim to complete Familiarisation for all Instructor Operators available on Ops Proving weekend (32/34), plus around 10 Upgrade Backfill Pool, plus around 10 "normal" T/Ops who drive extreme turns

SMA 1/2 Go Live Operational Readiness Dashboard 14-Aug

Workstream	Issues / Current Status	Go live	Sustaintability
T/Op Training	Given the late notice change of Go Live date, it has not been possible to ensure all the Met T/Ops are refreshed ready for 31-Aug. 24 T/Ops will be undertake CBTC conversion training or Refreshers before 31-Aug, leaving around 20 who are > 6 months since their refresher and won't be able to drive through the CBTC area. They will be refreshed from w/c 14-Sept		
SC staff training	10 SCL1 signallers required training for SMA 1 / 2, all out now complete ready for Go Live. Line Controllers (SCL2s) and Service Managers (SMs) don't require any additional training for SMA 1 / 2.		
Station Staff briefing	156 station staff required briefing on CBTC within the SMA 1 area (Edgware Rd, Paddington and Euston Sq groups) which have been completed. Those staff are undertaking eZone refreshers prior to Go Live. 136 station staff require briefing on CBTC within the SMA 2 area (Wemb Pk and Baker St) on target to complete		
Operational Restrictions	ORs and ISs fell by 12 from Ops Proving II as a result of fixes, however around 12 new ORs / ISs have been identified since then. Late circulation of the ORs to front line staff remains a concern in terms of their ability to understand and correctly apply the ORs post Go Live, particularly as the level of expert floorwalking declines.		
Ops Proving and Go Live plans	Plans are being developed and resources being secured for weekend of 31 August/1 Sept and beyond, including a Tracker to monitor all tasks, activities and issues. Weekly meetings with Line Management teams to review progress and concerns. The main focus is to arrange the T/Op familiarisation plans minimising the number of planned cancellations post 31-August – which could rise in number and duration as a result of the inability to complete refresher training.		
Trade Union consultation	ASLEF and RMT have disagreed with our proposal for Familiarising District line I/Os. Issue being escalated within Union management for a resolution – however District I/Os were familiarised on 20/21-July		
Reliability	Stakeholders accepted reliability for SMA 1 /2 at around 10 SAFs per day (equivalent to 6 SAFs over Ops Proving weekend). Analysis underway to determine the level of reliability at Go Live, particularly the TSR at entry boundaries, the number of Service Affecting Failures and S8 reliability.		
Operational publications	Several operational publications (such as Traffic Circular), documentation and plans (e.g. T/Ops rosters) which have already been published don't reflect the current plans, which potentially will lead to confusion during Ops Proving.		

9. Maintenance Readiness (Ricky Taylor)

UNDERGROUND
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SMA 2 Asset Operations - Threats

Workstream	Update	RAG
ADMF	• Review of Fleet ADMF status set up for 15th August. • Mitigation agreed to load data provided by Thales & retrospectively have SIMs representative validate this. • Thales to collect Tag data in VCC 2 whilst LU have been provided a cost code to have north signals maintenance collect tag data in VCC 1.	
Fleet (PV)	• S8 reliability to be reviewed post Operational Proving in order to identify any issues prior to go live. This remains a concern for go live, and mitigations to cycle trains through the CBTC area are currently being reviewed. • Boundary management support for go live weekend agreed with Fleet. This support will be reviewed 2/4 weeks post commissioning and ramp down will commence.	
ICS/CIS Readiness	• R3 of ICS was commissioned on 7th August, no issues to report thus far. • Confirmation of training delivery schedule required in order to begin SSM training. • O&M review ongoing and TtT for release 3 to be arranged.	
Operational Restrictions	• Signed safety letter now received from Thales containing ORIS. This is to be reviewed by SRP on 20/08. Staff briefings of ORIS to commence on 21/08.	
Software, Materials and Spares	• First delivery of 66 line items was received on 7th August. • 26 Line items outstanding to be delivered for SMA 1 & 2. Thales have advised that not all will be delivered prior to commissioning. LU to review current stock levels and agree mitigations if necessary. 22 of 26 items deemed acceptable for go live, awaiting review from 2nd line network team for final 4 line items. • Fleet Spares transfer from Ealing Common to Neasden is now complete.	

10. Ops Proving Support (Ricky Taylor)

UNDERGROUND
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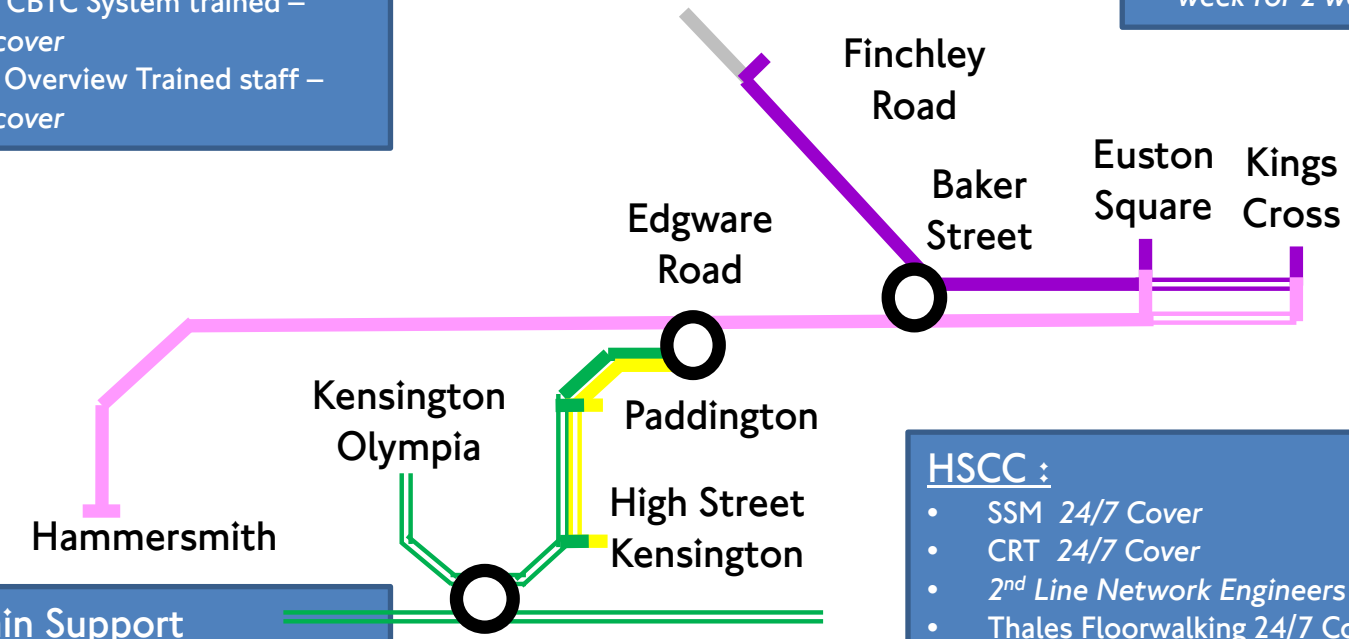
SMA 1 & 2 Go Live Support (31st August/1st September) Support

Support resource locations

Baker Street:
- Maintenance T.O Depot - CBTC trained T.O's and Maintenance Managers – *24/7 cover*
- C&I x4 – (Mon-Fri 9-5)
- MLCS Support – BAU C&I team

Boundary Support:
- *Finchley Rd SOT – COT 7 days a week for 4 weeks*
- *Euston Sq SOT – COT 7 days a week for 4 weeks*
- *Paddington District SOT COT 7 days a week for 2 weeks*

Ealing Common/Upminster /Neasden Depot:
- ATMs CBTC System trained – *24/7 cover*
- CBTC Overview Trained staff – *24/7 cover*



HSCC :
- SSM *24/7 Cover*
- CRT *24/7 Cover*
- *2nd Line Network Engineers*
- Thales Floorwalking 24/7 Cover (4 weeks post go live)
- C&I Support – (out of hours on-call support available via APCC)
- Ops Upgrades Team – *traffic hours cover*

On Train Support
- Instructor operator on every train where operator has not been signed off.
- Selective support from Ops Upgrades.

Palestra:
- DSIM - *24/7 cover*
- CACR -*24/7 cover*

11. Any other issues affecting Go Live

12. OR Extra Information

UNDERGROUND
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OR Peer Review – Assessment Criteria

- Proposed by LU Human Factors Engineering
- A '3D' view as opposed to the previous '2D' severity & likelihood
- Method uses the DIF Matrix and uses scores for 'Difficulty', 'Importance' and 'Frequency'

Definitions of 'Difficulty' rating criteria

Identifying when to follow the OR, actions required and burden on memory, newness / novelty

Score	Score description
1 (Low)	The OR does not require the operator to refer to the list of ORs. Self-explanatory in terms of use - only a single action required. Only limited requirement for memory and/or combining information sources.
2 (Medium)	May require more than a single action to find the item but use philosophy is simple. Requires only one or two actions or piece of information/options to be remembered or combined. The OR relates only to core CBTC functionality.
3 (High)	The OR Requires multi step navigation to find the item, or, Philosophy of use requires good knowledge of the system, or, Requires a number of pieces of information/options to be remembered, or The OR relates to new CBTC functionality.

OR Peer Review – Assessment Criteria

Definitions of 'Importance' rating criteria

Score	Score description
1 (Low)	Limited effect on efficient running of the railway.
2 (Medium)	Has a moderate effect on efficient running of the railway.
3 (High)	Has safety significance or is essential to efficient running of the railway.

Definitions of 'Frequency' rating criteria

Score	Score description
1 (High)	Frequently used: When an OR is used frequently, this use provides constant reinforcement of the learning in itself. Therefore, a highly used OR actually requires less training than an infrequently used one.
2 (Medium)	Moderately frequently used.
3 (Low)	Infrequently used: When an OR is infrequently used, it may require specific training and/or the addition of an 'aide memoire' within the workplace for the occasions in which it is called into use. This is because the learning is not reinforced on a regular basis and so it is easier to forget.
0 (Low)	Infrequently used but not likely to forget (e.g normal process applies, prompted by alarm or prompted by instruction from others)

Overall Rating

Add up the DIF scores, then assign an overall rating.

The overall rating can then be used to give the panel an understanding of the distribution of types of OR, from the trivial to the highly important. This can be used to aid decision making around the acceptability of the ORs.

Total Score	Score description
2, 3, 4	Low
5, 6	Medium
7, 8, 9	High

OR Peer Review - Train Operators

Operating Restriction Log Snapshot (for review):

4LM-R280-SSL-LOG-00003 - 4LM Restrictions Log - snapshot 20.08.2019 - Train Ops

Summary of #s

Status	# ORs
SMA 0.5	5
SMA1/2	8
New at SMA1/2	3
Requiring Action	7
For Information Only	1

Summary of indv. Rating (7 x ORs)

Status	# ORs
3,4 (low)	6
5,6 (medium)	1
7,8,9 (High)	0

Agreed peer review status:

Agreed peer review notes:

OR Peer Review – Service Control

Operating Restriction Log Snapshot (for review):

4LM-R280-SSL-LOG-00003 - 4LM Restrictions Log - snapshot 20.08.2019 – Service Control

Summary of #s

Status	# ORs
SMA 0.5	26
SMA1/2	41
New at SMA1/2	20
Requiring Action	40
For Information Only	1

Summary of indv. Rating (40 x ORs)

Status	# ORs
2,3,4 (low)	15
5,6 (medium)	21
7,8,9 (High)	4

Agreed peer review status:

Agreed peer review notes:

OR Peer Review – Maintenance Signalling

Operating Restriction Log Snapshot (for review):

4LM-R280-SSL-LOG-00003 - 4LM Restrictions Log - snapshot 20.08.2019 – Maint Signalling

Summary of #s

Status	# ORs
SMA 0.5	35
SMA1/2	47
New at SMA1/2	21
Requiring Action	18
For Information Only	29

Summary of indv. Rating (18 x ORs)

Status	# ORs
2, 3, 4	12
5,6 (medium)	4
7,8,9 (High)	2

Agreed peer review status:

Agreed peer review notes:

OR Peer Review – Maintenance Fleet

Operating Restriction Log Snapshot (for review):

4LM-R280-SSL-LOG-00003 - 4LM Restrictions Log - snapshot 20.08.2019 – Maint Fleet

Summary of #s

Status	# ORs
SMA 0.5	9
SMA1/2	9
New at SMA1/2	1
Requiring Action	2
For Information Only	7

Summary of indv. Rating (2 x ORs)

Status	# ORs
2,3,4 (low)	2
5,6 (medium)	0
7,8,9 (High)	0

Agreed peer review status:

Agreed peer review notes:

13. Reliability Predictions following Operational Proving II Extra Information (Sam Etchell)

UNDERGROUND
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SMA1/2 Revenue Service – Engineering Reliability Predictions

	OP II	Go Live (pro-rata-ed)	Mitigated Go Live	Mitigated post 4.13.21 S7 / 2 weeks into service	Notes
4.13.00 incompatibility	4	7	4	0	Assume 50% of S7 fleet at 4.13.21 at go live. SAFs removed with 4.13.21 rollout
Slip / Slide	1	2	0	0	Mitigated with use of ACAAT (not used in Ops Proving). Noted that slip / slide may randomly occur in poor adhesion, built into existing predictions
Component failure	1	2	0	0	Random VOBC failure not seen on S7 fleet in SMA0.5. Noted that failure could randomly occur, built into existing predictions
Single VOBC	1	2	0	0	Assumed single VOBC will not cause SAFs under normal redundancy. Built into existing predictions
Mitigated by ORs	7	12	6	3	Mitigated via ORs. Assumed 50% success rate of ORs at Go Live increasing to 75% after 2 weeks
Totals	**14**	**24**	**10**	**3**	

- Assuming a scale factor of 1.7 between Operational Proving and Go Live (based on train service scaling)
- This analysis is only against the SAFs seen in Operational Proving II. It does not replace the previously published predictions
- The predicted SAFs (at +2 weeks) from this analysis are catered for by the allowances within the previously published predictions