

CROSSRAIL

A Contractor's Observations

28th September 2016



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C305 Eastern Running Tunnels

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Crossrail Timeline

- 1974 London Rail Study
- 1990 Government go-ahead to develop the east-west Crossrail scheme
- Crossrail Ltd (CRL) – Established 2001
- Crossrail Act 2008 (£14.8bn)

Crossrail Benefit

- The estimated benefit of Crossrail to the UK economy is at least £42 billion
- Crossrail will bring additional 1.5 million people within 45 minute commute of London's key business and entertainment districts.
- Central section 24 trains per hour will run in each direction
- 10% increase in London Rail Capacity

The Joint Venture

Formed Joint Venture with Dragados SA to bid for Crossrail contracts. Successful with first bid for Contract C305 Eastern Running Tunnels.



NEC Target Cost Option C contract. Tender value circa £500M the largest single Crossrail construction contract.

Start January 2011 – Completion Autumn 2016

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Market Engagement

- Before Prequalification Stage, Crossrail engaged in various initiatives including :
 - Open presentations
 - Open consultations including workshops
 - One to one consultations
 - Questionnaires
- These helped to inform and guide
 - Package values
 - Risk appetite – general and specific
 - Tender program and format
 - Specific risks and issues

Evaluation Criteria – Quality:Price

- Early Crossrail tenders based on 60:40 Quality:Price split.
- Later Crossrail projects were based on 70:30 split, and subsequently a 70:25:5 (Quality: Price: Fee split).
- Quality submissions grew from 160 pages to 340 pages from early to later tenders with a consequential increase in tender costs

Contract Mark-up

- Although qualifications were discouraged on Crossrail projects, there was a facility for same – this included justification for the qualification and adjustment to tender sum if not accepted
- Early engagement on many tenders has allowed specific problem clauses to be addressed early to

<i>Document Clause reference</i>	<i>Qualification expressed as proposed drafting amendment (mark up of the relevant provision of the Contract or ancillary document)</i>	<i>Explanation of why the proposed amendment is necessary</i>	<i>If CRL does not accept the proposed amendment, adjustment to the Tenderer's tender price required to withdraw the Qualification</i>

Project Bank Account

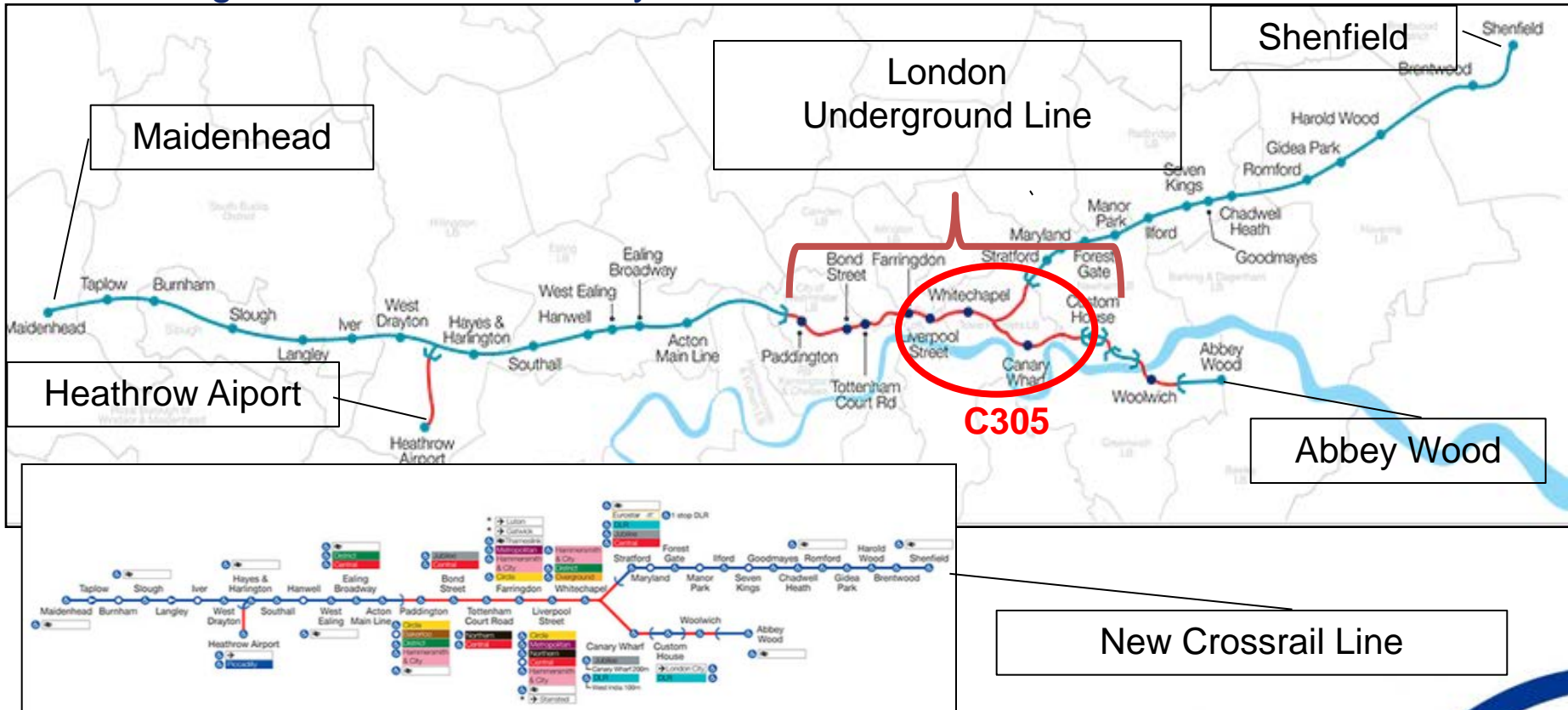
- Defined Terms :
 - *“Project Bank Account is the account in the name of the Employer used for the sole purpose of receiving payments from the Employer and making payments to the Contractor and Subcontractors and all other payments of Defined Cost.”*
 - *“Trust Deed is an agreement between the Employer and the Contractor which contains provisions for administering the Project Bank Account.”*

Principle Functions of Project Account :

- Full Transparency of all payments in and out (Lends itself well to NEC3 Option C, Open Book)
- Control of contract monies leaving account
- Ensure subcontractors paid in case of Main Contractor difficulties (escrow)

Project Overview

Crossrail is a subsidiary company of TfL (Transport for London) created for the construction of a new transverse train line 118 km long, including 21 km underground below London city.



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Tunnel Contracts

Contract C300:

- Twin Tunnel 6,2 km (Drive X)

Contract C305:

- Twin Tunnel 8,2 km (Drive Y)
- Twin Tunnel 2,7 km (Drive Z)
- Twin Tunnel 0,9 km (Drive G)



Contract C310:

- Twin Tunnel 2,6 km (Drive X)

C305 Project Description

- TBM Tunnels EPB type 7,1 m diameter:
 - Drive Y: 8,2 km twin tunnel between Limmo Peninsula and Farringdon Station
 - Drive Z: 2,7 km twin tunnel between Stepney Green and Pudding Mill Lane
 - Drive G: 0,9 km twin tunnel between Limmo Peninsula and Victoria Dock

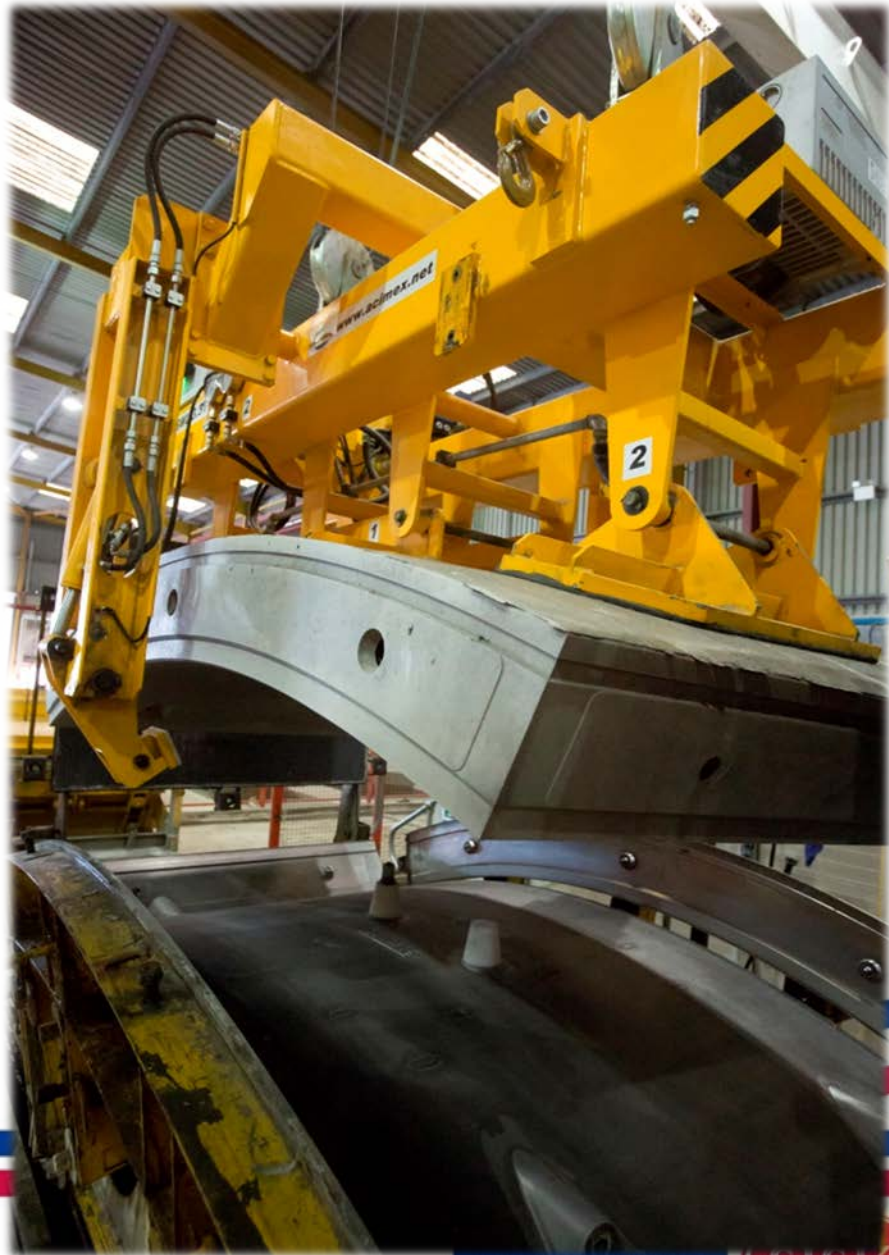
23,6 km of TBM tunnel under London city

- Launching Shafts:
 - Drives Y&G Launching Shaft: Limmo Peninsula
 - Drive Z Launching Shaft: Stepney Green
- Cross Passages between running tunnels





Chatham Segment Factory
(13,500 rings manufactured)



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Segment logistics

- Factory location to support marine transport
- Demolition and construction of a facility for casting PCC tunnel segments
 - Twin carousel operated 24/5 basis producing 40 rings a day
- Marine transport by barge to Limmo site in 1000te cargoes.



Instone Wharf

- Upgrade of 190m existing wharf
- Berthing for two 2500 DWT vessels
- Loading facilities for tunnelling spoil
- Storage & re-loading facility for 5000m³ spoil
- River transportation: 13,500 rings plus 2m tons waste shipped
- Segments supply and excavated material by Thames River with no traffic impact



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Utilities

- Utilities Packages (NEC 3 Option E)
 - HAM and Wick Sewer
 - Victoria Dock Road diversions (and street works)



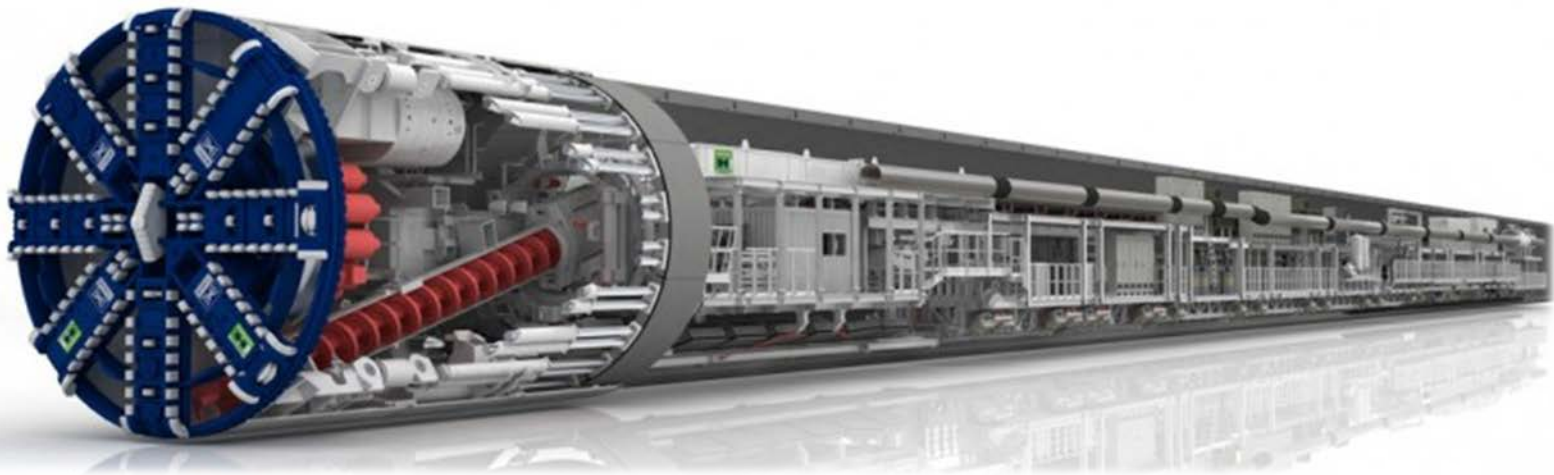
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The TBM

- TBM shield 12m Long (560T)
 - PCC segments get erected inside the Shield, the TBM advances by punching forwards from the previously constructed PCC ring
- The back up Bridge / Gantries ~135m (500T)
 - The back up gantries roll on wheeled bogies that run on the PCC segment invert
- Total 135m long 1050T

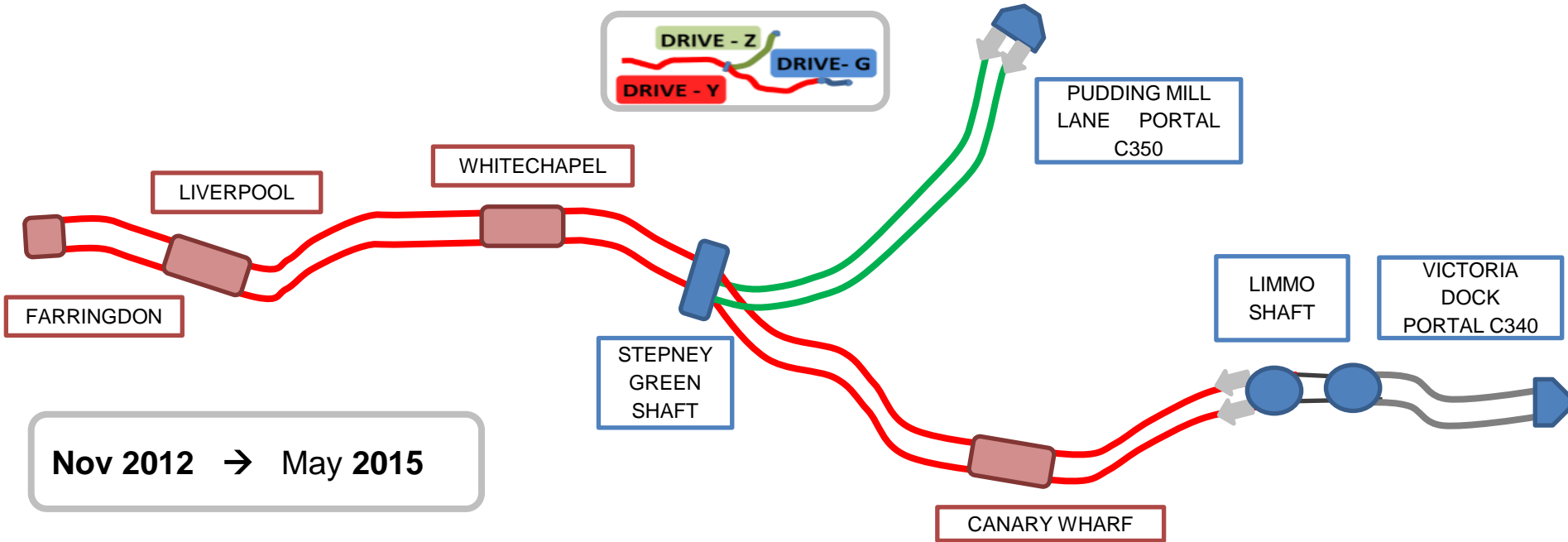


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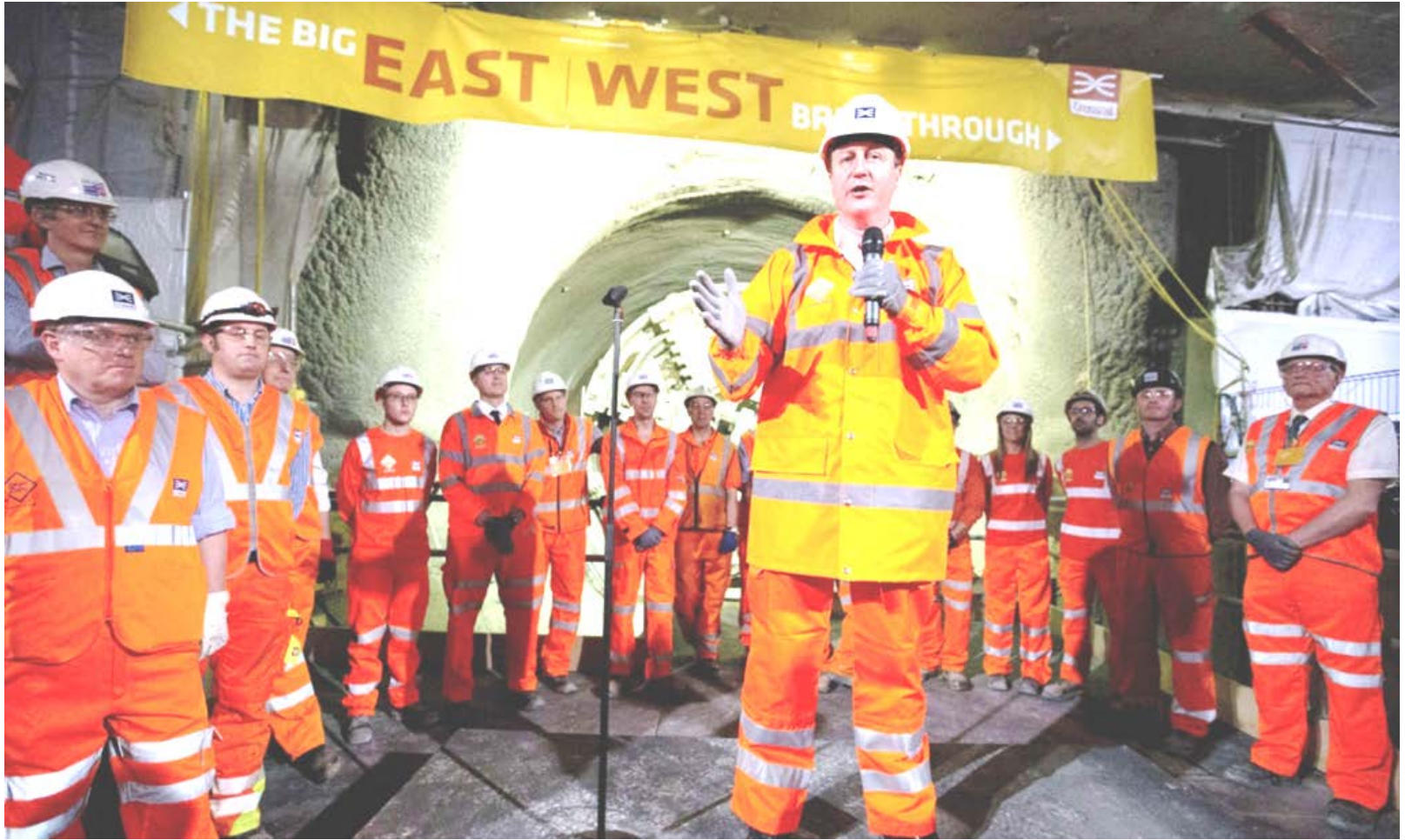
Tunnelling Performance



DRIVE Z

- Maximum daily production **72 meters in one day**
- Maximum weekly production **296 meters in one week (42,3m/day)**
- Maximum monthly production **1175 meters in one month (39,2m/day)**

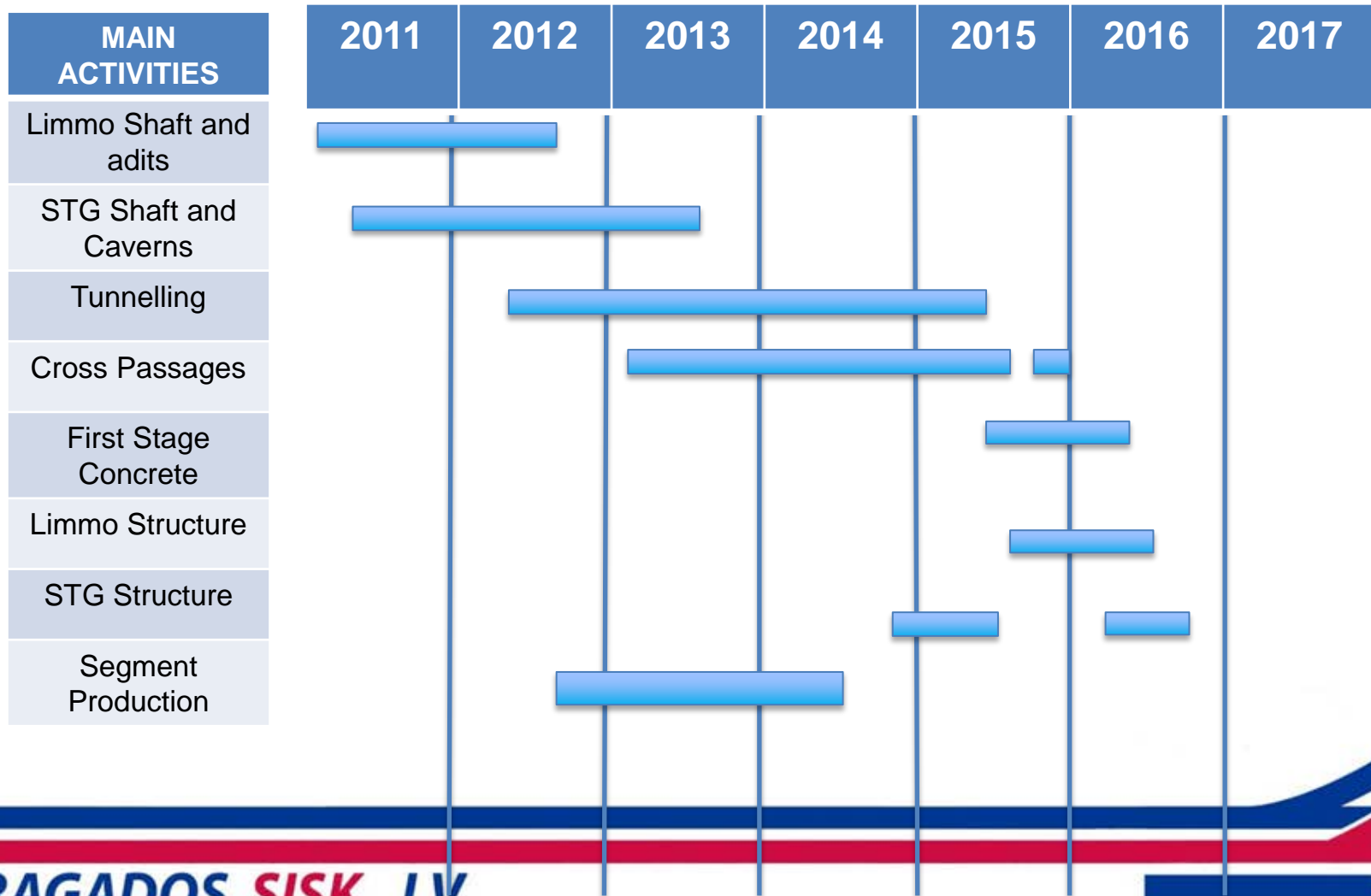
Completion of Tunnelling Works



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C305 Programme



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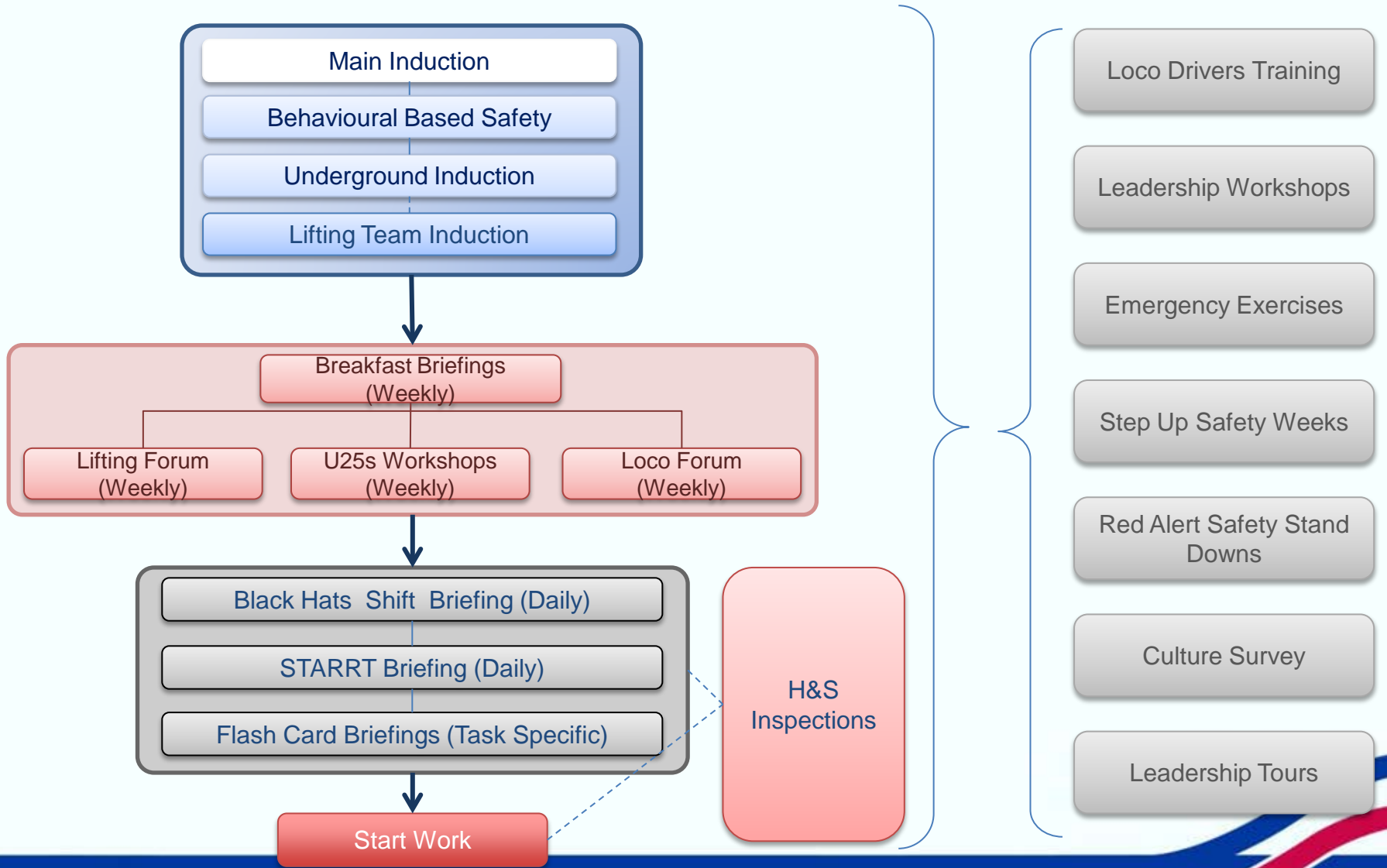
Contract Administration

- Large volume of Communications:
 - 6,625 Reports [Construction, Eng.,Monitoring,...]
 - 1,568 Method Statements
 - 1,000 Temporary Works drawings
 - Countless number of meetings,.....

- Good level of Metrics:
 - Quantity.
 - Timeframes.

C305 Metrics				
	Total	Open	Closed	% Metric
Project Manager Communications	2667	41	2626	98%
Contractor Communications	2238	34	2204	98%
Early Warning Notices	1563	28	1535	98%
Project Manager Instructions	988	n/a	n/a	-
Notice of Compensation Events	665	31	634	96%
Contractor Quotations	718	30	688	96%
Implemented Compensation Events	544	n/a	n/a	-

Health and Safety. Communication ↔ Engage



Health and Safety. Communication ↔ Engage

TRAININGS & WORKSHOPS

- Simulated fire and rescue situation on TBM
- Man overboard rescue exercise with RNLI & London Coastguard
- Tool box talks & Emergency Exercises



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Thank You



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