

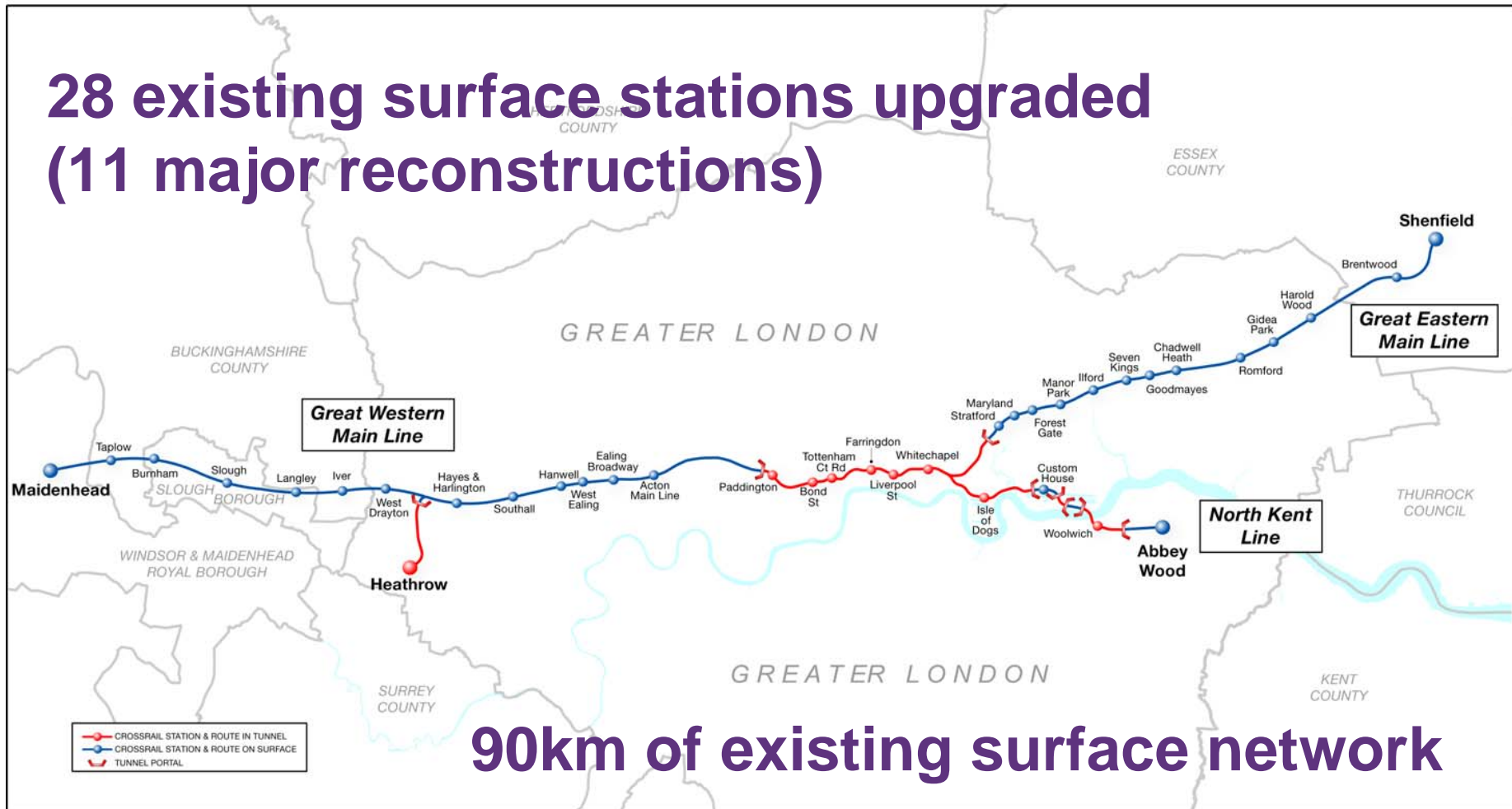


**Simon Phillips**  
**Construction Logistics &  
Excavated Material**  
**April 2009**

# Crossrail Route



**28 existing surface stations upgraded  
(11 major reconstructions)**



**90km of existing surface network**

# Central Section



**21 km of new sub-surface twin-bore railway  
through London**

**8 sub-surface stations**

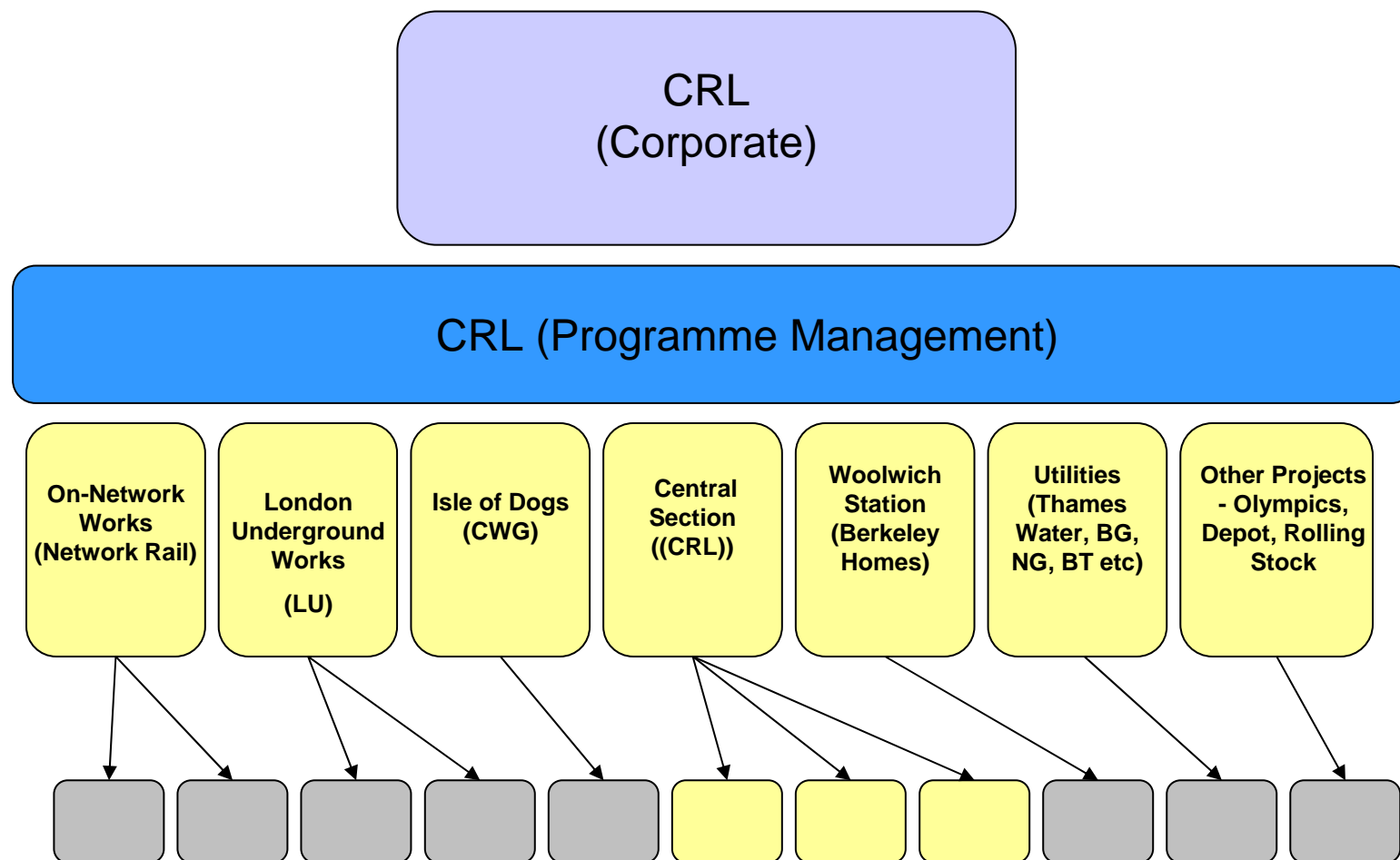


# Crossrail

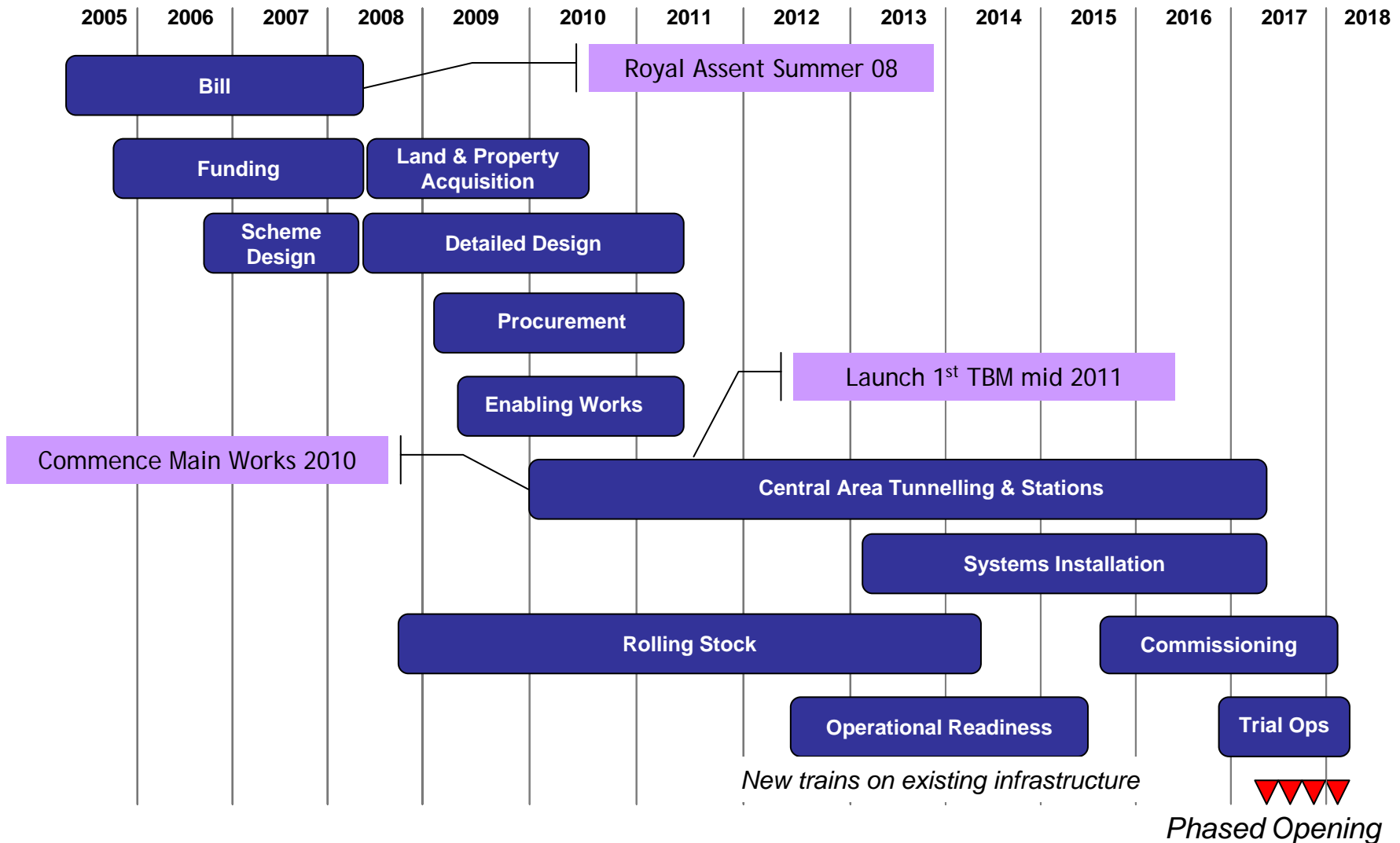


- Development Agreement signed 4 December
- TfL subsidiary company
- Chairman designate – Terry Morgan
- CEO - Rob Holden of CTRL
- Programme Partner - Transcend
- Delivery Partner - Bechtel
- Works Partners

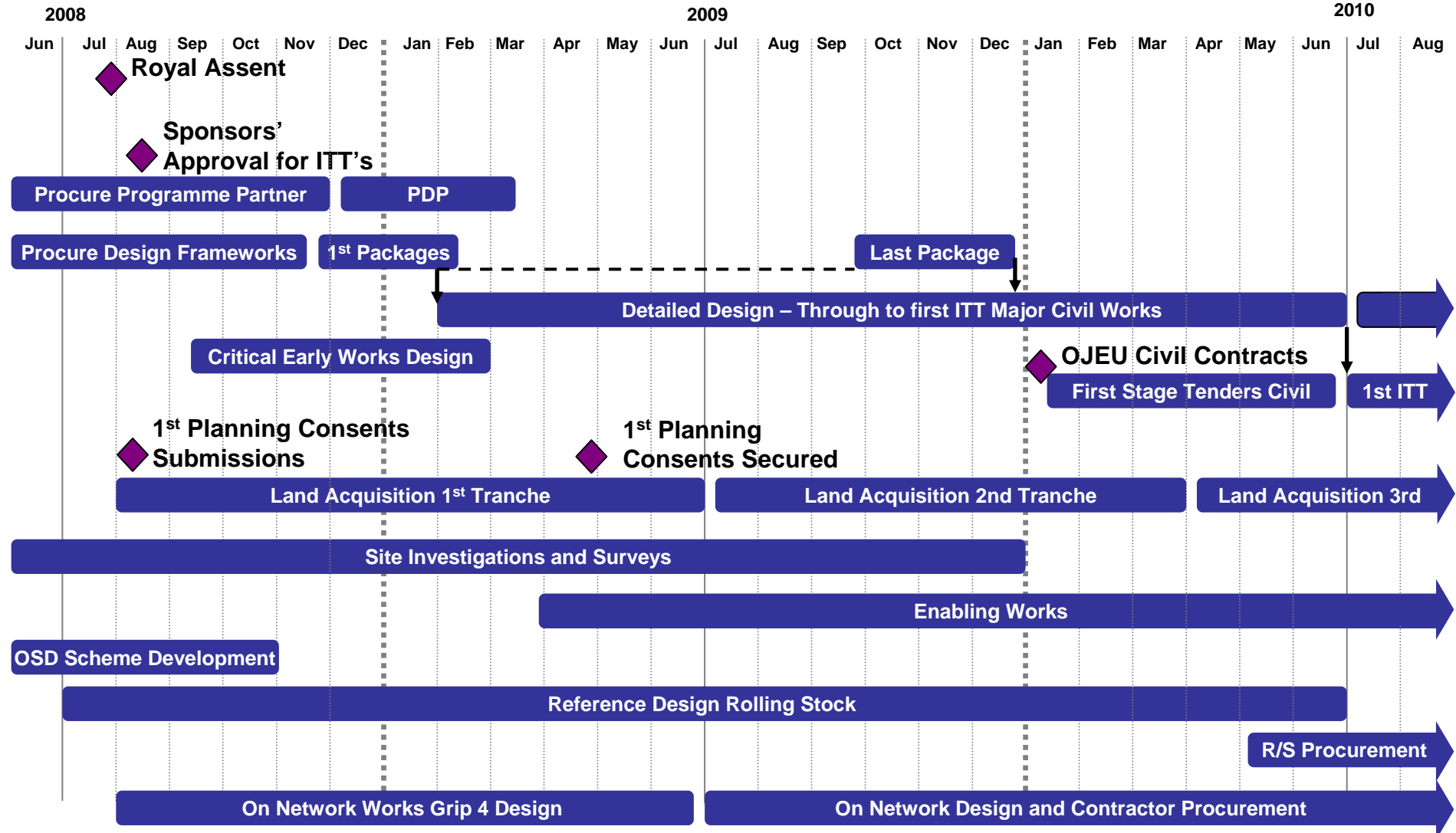
# Programme Management



# Summary Programme

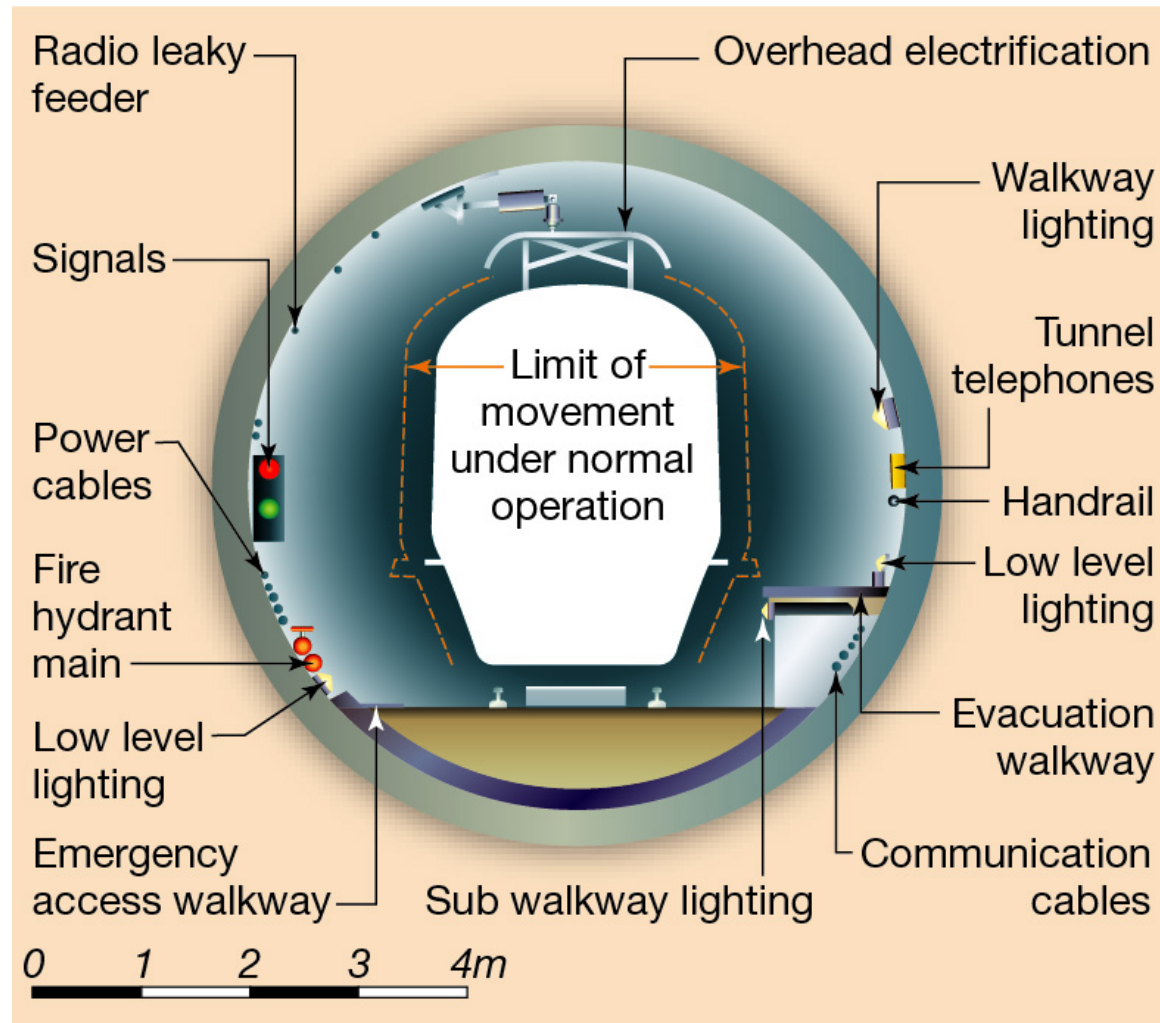


# Crossrail Programme (2-year look ahead)



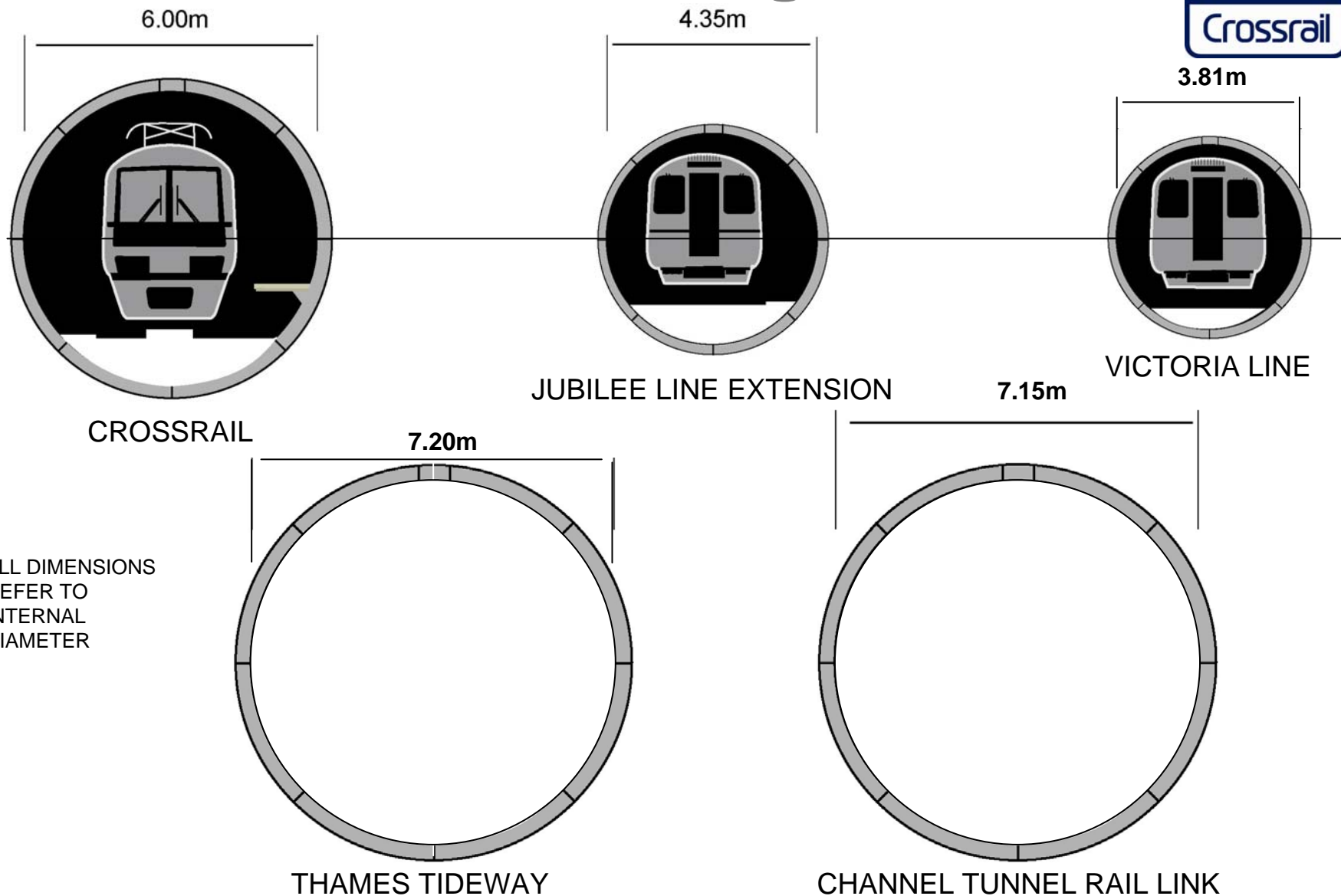
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# Running Tunnels

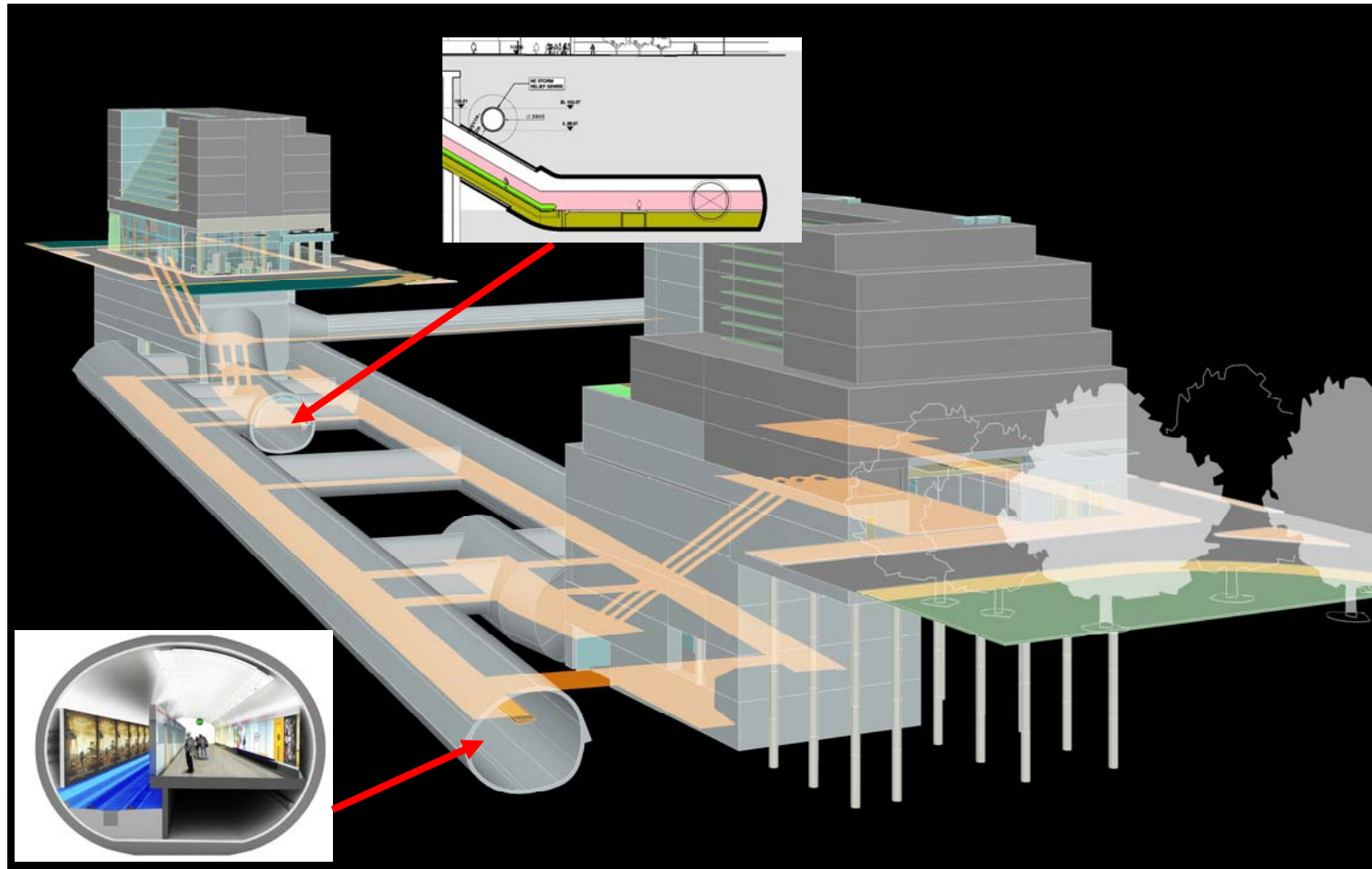




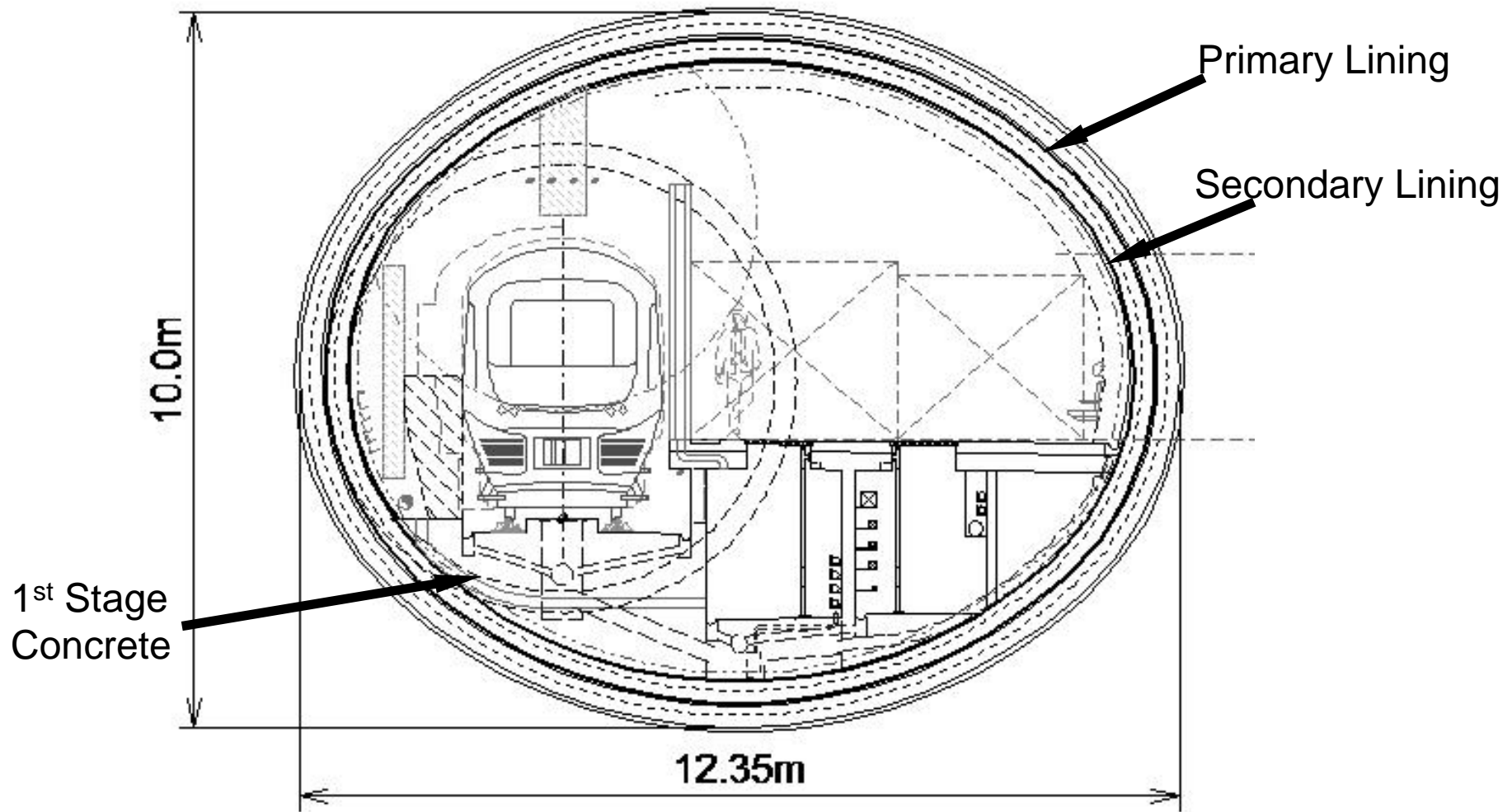
# Comparative Running Tunnels



# Typical Mined Station Bond Street



# Typical Platform Tunnel Cross Section

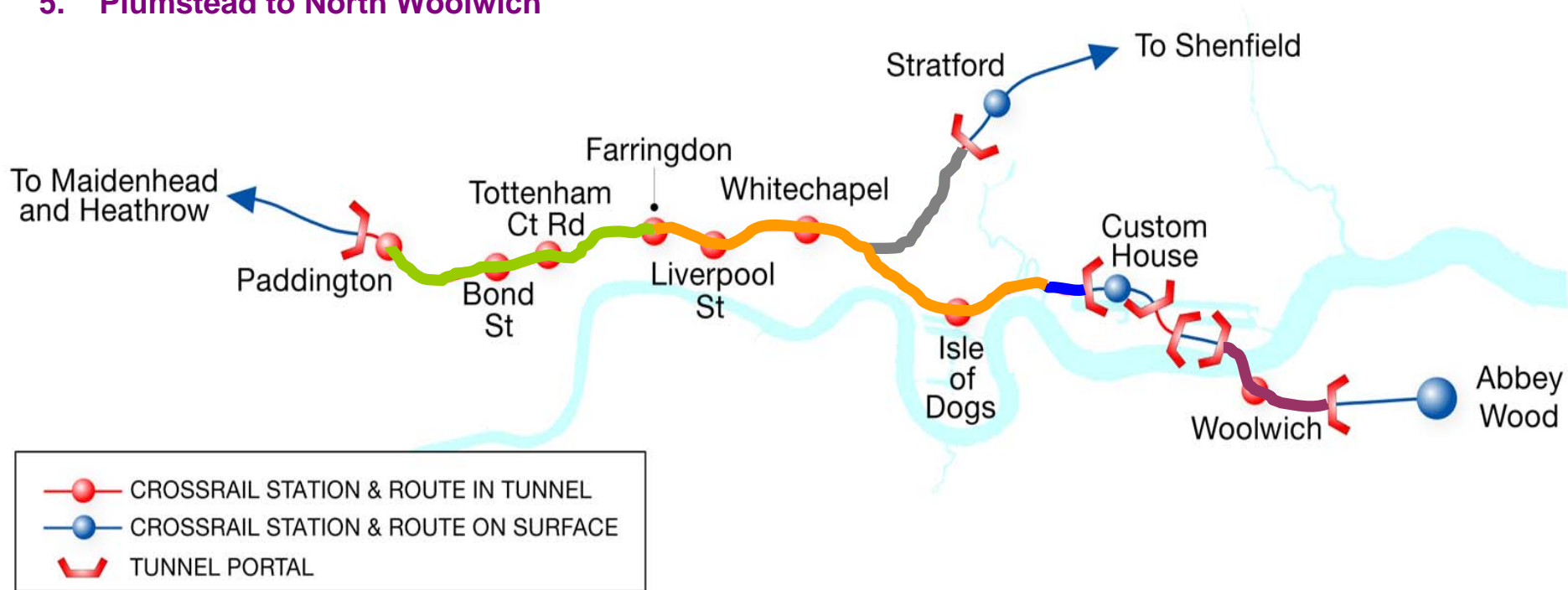


# Tunnelling Strategy

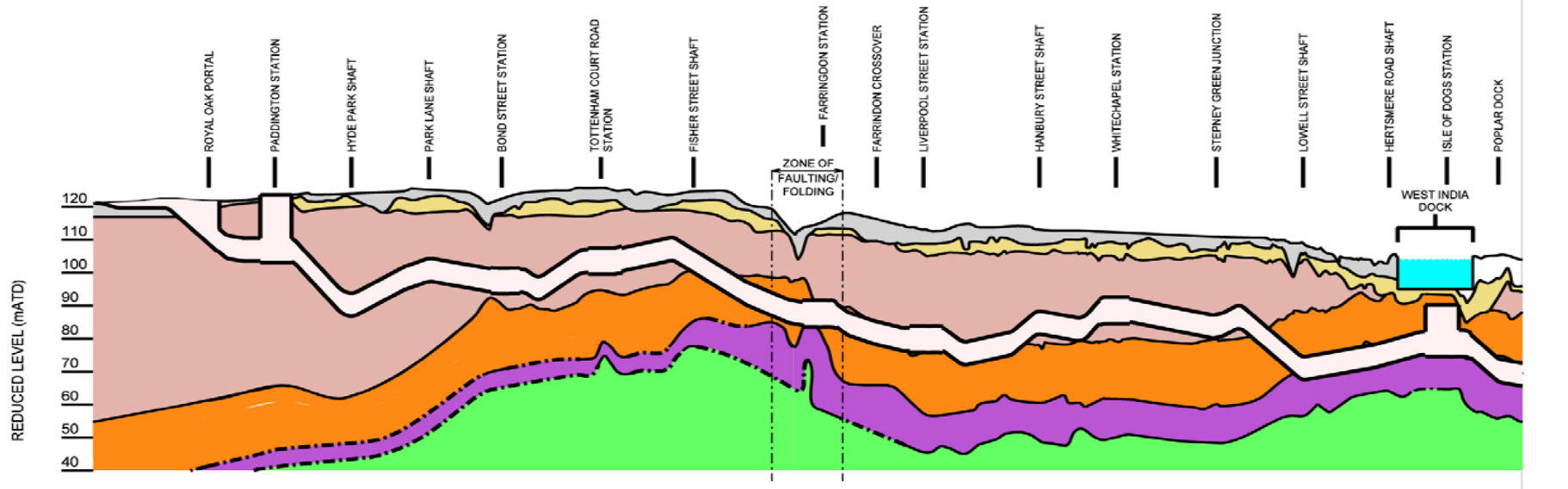


## Proposed TBM Drives

1. Royal Oak to Farringdon
2. Limmo to Farringdon
3. Stepney Green to Pudding Mill Lane
4. Limmo to Victoria Dock Portal
5. Plumstead to North Woolwich



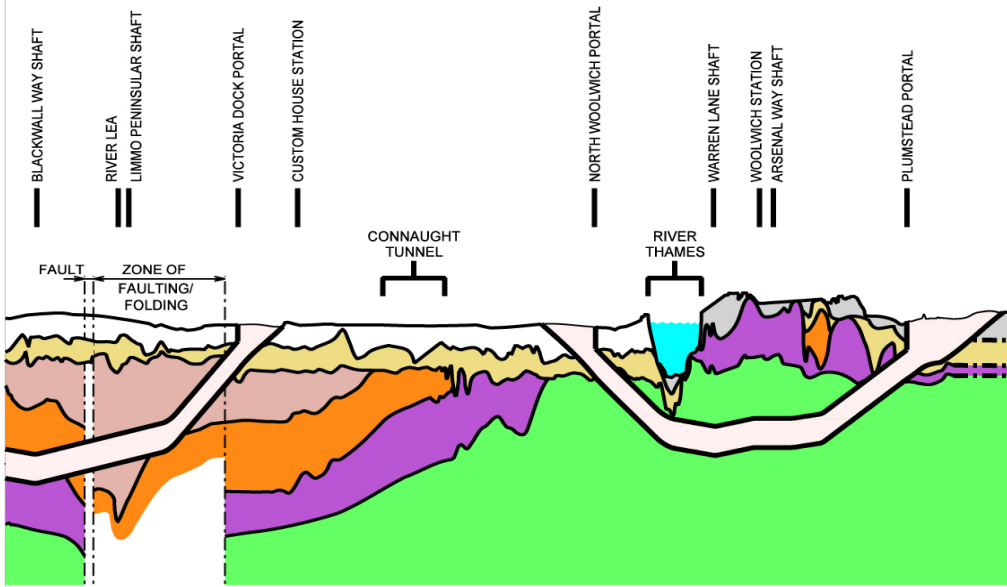
# Central Tunnels Geology Long Section 1



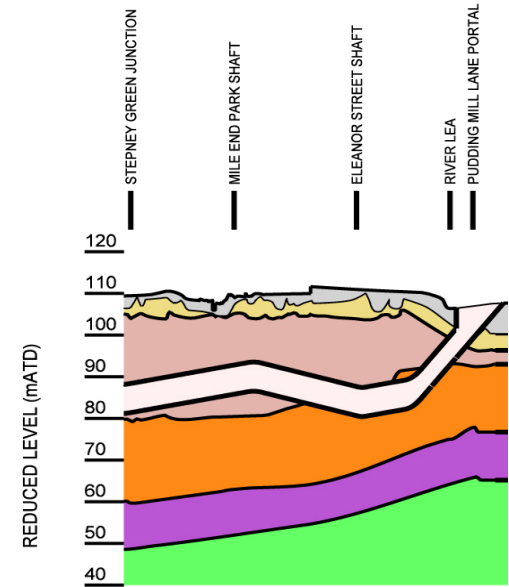
Royal Oak Portal – Isle of Dogs Station



# Central Tunnels Geology Long Section 2



**Blackwall Way Shaft – Plumstead Portal**



**Stepney Green Shaft – Pudding Mill Portal**



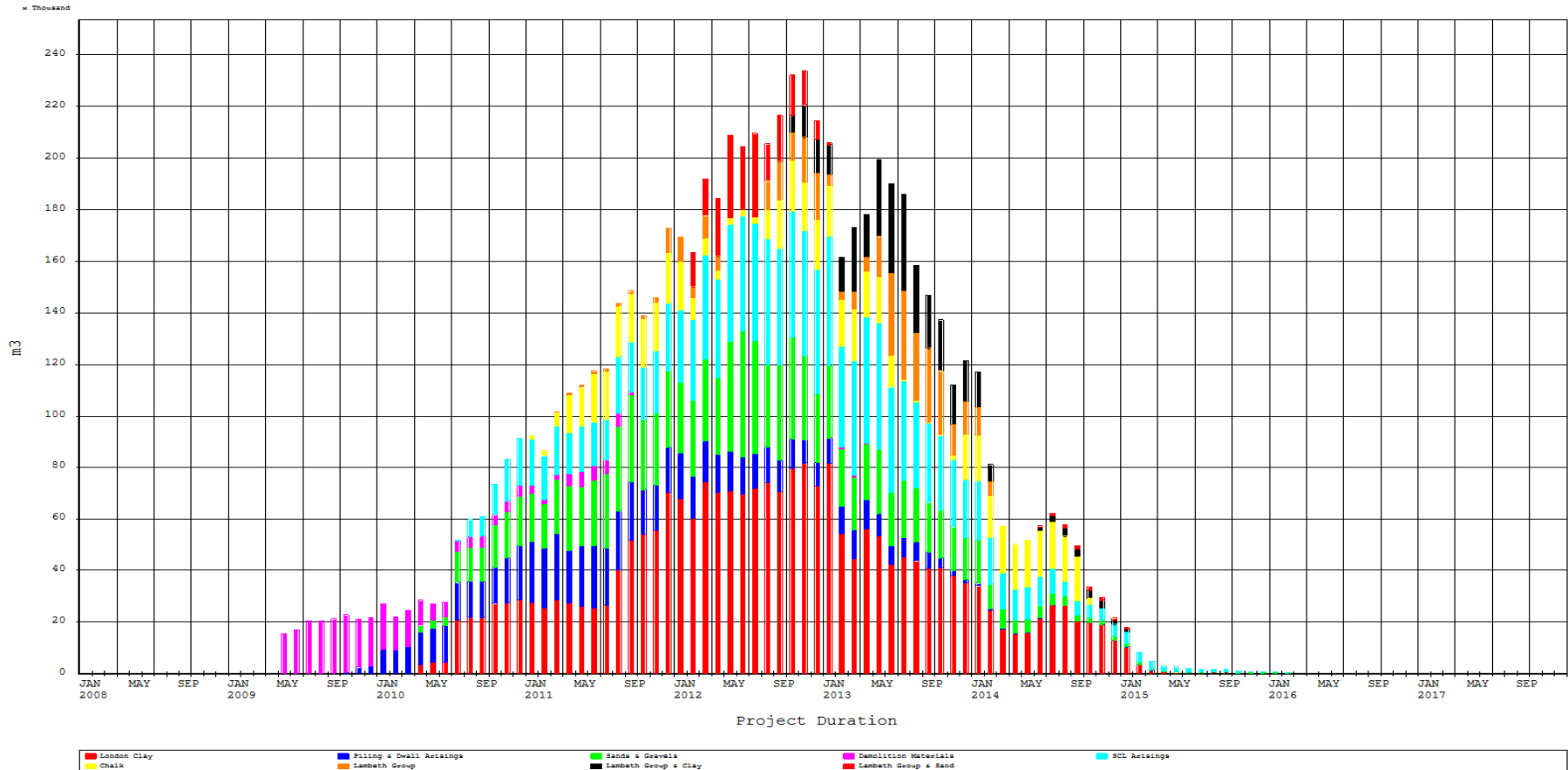


# Excavated Material



• Clay	2.3M m <sup>3</sup>
• Piling & Diaphragm Walling Arisings	0.68M m <sup>3</sup>
• Sprayed Concrete Lining	1.4M m <sup>3</sup>
• Sand & Gravels	1.15M m <sup>3</sup>
• Chalk	0.6M m <sup>3</sup>
• Lambeth Group	0.9M m <sup>3</sup>
• Demolition arisings	0.27M m <sup>3</sup>
<b>TOTAL</b>	<b>7.3M m<sup>3</sup></b>
• Recovery/Recycling Aggregate & hardcore	-2.0M m <sup>3</sup>
<b>FOR BENEFICIAL REUSE</b>	<b>5.3M m<sup>3</sup></b>

# Excavated Material Histogram



Project Start 22APR02 Project Finish 27FEB18 Data Date 6OCT06 Plot Date 1NOV07	SHEET CrossRail Construction Programme Spoil Histogram-All	Sheet 1 of 1	<table> <tr> <th>Date</th><th>Revision</th><th>Checked</th><th>Approved</th></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Date	Revision	Checked	Approved																				
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(c) Primavera Systems, Inc.



# Excavated Material



- Over 200k m<sup>3</sup> per month at peak
- Material generated 2010 – 2015
- Initial transport
  - 14% by rail
  - 39% by barge
  - 47% by road
  - 1M m<sup>3</sup>
  - 2.9M m<sup>3</sup>
  - 3.4M m<sup>3</sup>
- Overall 85% of transport is by water and rail on a volume/mileage basis

# Transport



Generally 300 loads per day in  
Central London

Peak: 150-200 lorries moving c600  
loads per day Crossrail wide



4 trains of 20 wagons per day



5x 2000 tonne ships per day plus  
barges

# Location of Sites



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# Wallasea Island



- RSPB scheme to transform, in a phased and managed way, 620 hectares of arable farmland into the coastal marshland it once was.
- The newly restored landscape will be a wetland mosaic of mudflats and saltmarsh, shallow lagoons and pastures.
- Criss-crossed by higher level bunds to provide access.
- Capacity to take approximately 10M m<sup>3</sup> bulked.
- All excavated material delivered by water.
- Planning application submitted



# Wallasea Island



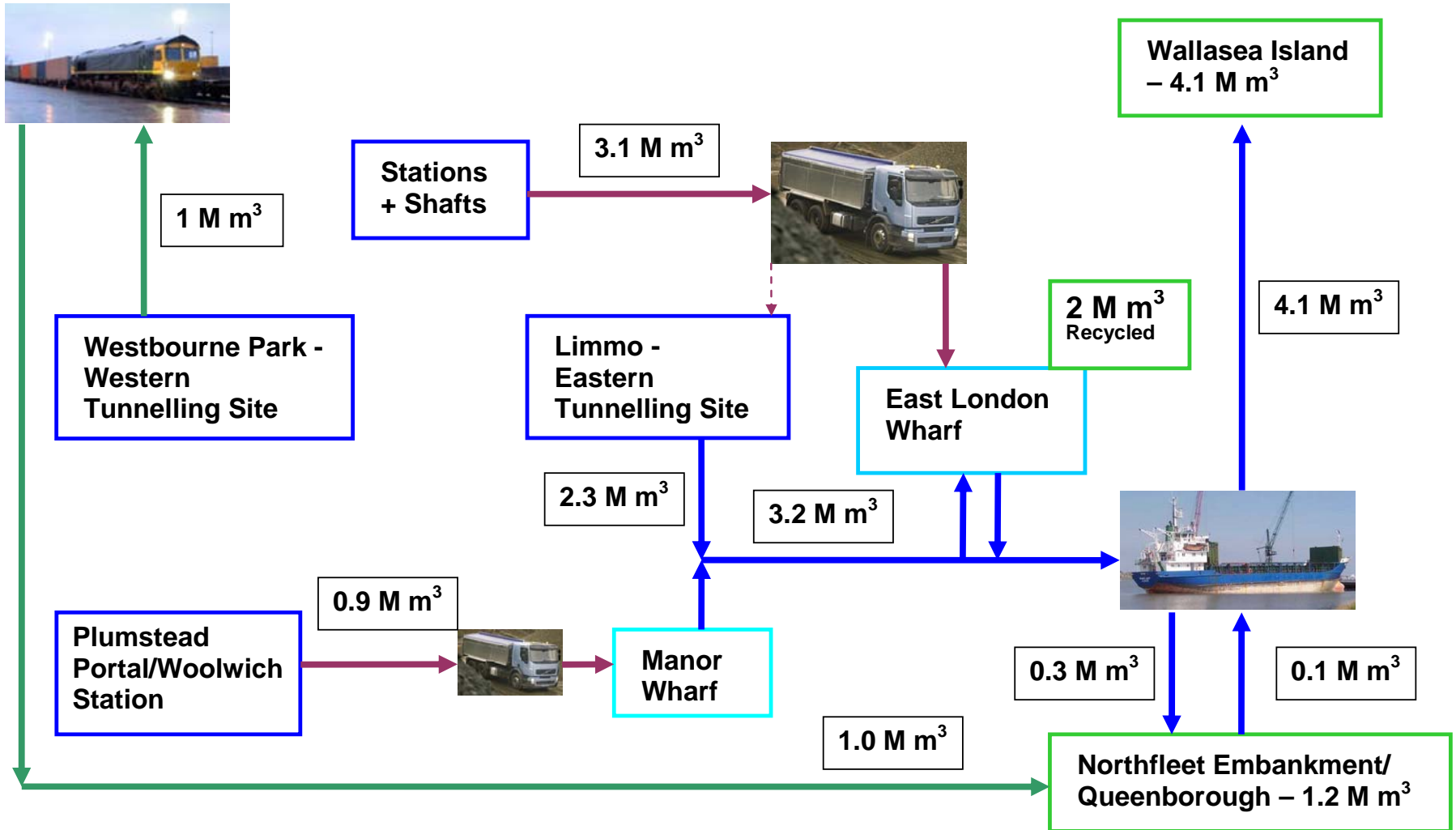
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# SEEDA Sites



- Two schemes to create mixed use development platforms
- Northfleet Embankment – 800k m<sup>3</sup> bulked/460k m<sup>3</sup> compacted
- Queenborough & Rushenden– 400k m<sup>3</sup> bulked/250k m<sup>3</sup> compacted
- All material planned to be delivered by rail and water
- Programme 2011 onwards

# Movement of Excavated Material





# Logistics

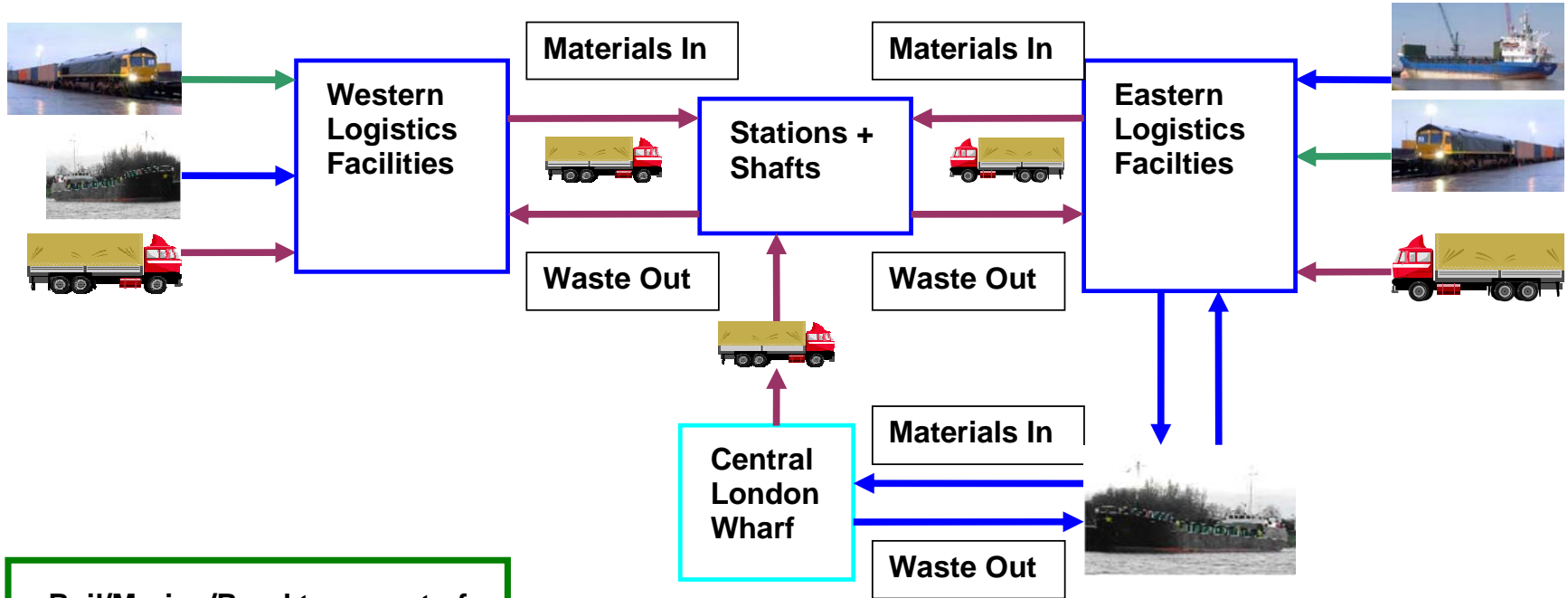


# Logistics Principles



- Enabling and ensuring efficient production
- “Control Tower” approach for transportation/ materials
- Just in time deliveries – Central London sites
- Consolidation Centre/Logistic facilities for deliveries
- Maximise marine/rail deliveries
- Maximise off-site modularisation and preassembly
- Waste minimisation and recycling maximisation
- Concrete/aggregate supply strategy

# Logistics Centres- Principles



**Rail/Marine/Road transport of  
Excavated material direct to  
destination**



**Only wet concrete  
and abnormal  
loads direct to site**





*a world-class, affordable  
railway delivered through  
effective partnerships and  
project excellence*