

18 JULY 2019

# Bakerloo Line Extension

Update on optioneering for TBM launch and line wide construction



## Re-cap of Tunnelling and Main Work Site in context of New Cross

- In 2017 we included in our consultation the following in the section on New Cross Gate station:

The size of the proposed site provides several opportunities for the project. It could allow soil to be taken away by train rather than using local roads. We could also start the tunnel machinery from this site.

- Our initial work following the consultation focused on the station options and reviewing the consulted and alternatives. We came to the conclusion the consulted alternative remains our preferred option.
- As we progressed this work, we commenced consideration of the site for rail logistics and tunnelling activity. We previously presented pre-feasibility work on the rail logistics and articulated the potential role of the site for Tunnel Boring Machine reception. Sainsbury's and Mount Anvil suggested alternative tunnelling site options of Hither Green, Goodwood Road, Wearside Road and somewhere on the Old Kent Road. All except Goodwood Road are relevant to tunnelling.



## How have we developed our work?

- Since our consultation in 2017, we have considered a whole line design, that has involved the consideration of a number of Primary Tunnelling worksites
- A Primary Tunnelling site is capable of hosting tunnel construction on a continuous 24/7 operation. It is also the location from which the Tunnel Boring Machines (TBMs) are launched, supplied and serviced.
- The principal worksite must be able to support two key activities, disposing excavated muck and supplying precast tunnel linings to the TBMs. It must therefore have direct links to reliable logistic routes but also have sufficient on-site storage to allow tunnelling operations to continue should the supply routes be interrupted.
- We commenced the study from an identified set of TBM launch site options which were likely to be serviceable by rail freight. The Primary work sites considered are:
  - Hither Green Rail Triangle sidings
  - New Cross Gate Sainsbury's Retail Park and Network Rail compound
  - Catford Wickes Retail Park and St Dunstan's Playing Fields
- We have also considered a Secondary site on the Old Kent Road and if New Cross Gate has a purpose to serve as a Secondary site, as it is on line of route, where it is not the Primary site.



## What have we considered as we developed our work?

- The work we have undertaken has focused on:
  - Reducing the amount of infrastructure build on the line on the critical path.
  - Considering how the programme duration costs balance against programme risks and tunnelling machine costs (and therefore varying the number of tunnelling machines used).
  - Considering whether multiple sites relating to whole line construction and tunnelling create a shorter or less risky & costly programme.
  - Continuing to focus on minimise road based traffic for muck-away and potential supply to sites.
  - Ease of use and access for each site.
  - Environmental impacts on each site.
  - Synergies with other proposed infrastructure.
  - Fit with the wider requirements and ambitions for the scheme, particularly related to any extension beyond Lewisham.



## Tunnelling Strategy Scenarios considered

- We have considered a wide range of strategies.
- The core variables for the strategies are:
  - The assumed worksites in use, ranging from assuming a single Primary site to assuming a combination of Primary and Secondary sites.
  - The number of TBMs used.
  - The type of TBMs used (e.g. Variable Density, Slurry, Earth Pressure Balance).
  - The direction of drives and the implications on programme of both the drive itself and its outcome in terms of the works to infrastructure on the section of route.
- Considering a wide range of strategies has enabled us to ascertain the common features of those that are lower risk and duration. This includes features in terms of work sites required.



## Secondary Tunnelling Worksites (I)

- The main TBM tunnelling works is a critical path activity that controls station works at a given principal worksite.
- The use of a secondary worksite reduces the overall critical path by splitting the programme into component parts that can be under taken concurrently. It also allows early start on tunnel fit out works and commissioning.
- As we progressed our work on tunnelling and whole line construction strategies, we identified two key aspects.
- The first is that due to the scale of station upgrade work required at Elephant and Castle and that the geology of London's soil switches from Chalk to the Lambeth Group of sands and clay beds around the site of OKR I (Tesco), we considered whether a TBM launch and / or reception site is advantageous.



## Secondary Worksites (2)

- In addition, we have also considered the importance of the New Cross Gate (NCG) site given it is on the route, around the mid point of, the extension.
- We considered whether in the scenarios that TBM launch is undertaken from alternative sites from NCG, activity at that site still warrants rail logistics. We have determined that doing so can allow the tunnelling plant elsewhere to be decommissioned and allow the start of fit-out and cross-passage works from either of those sites.
- In both instances of OKR I and NCG, we have identified that both sites are beneficial in supporting the whole line construction that requires greater activity than station construction alone.



## The emerging construction strategy for an extension

- New Cross Gate is fundamental to any credible construction strategy. Without it, the extension is significantly more costly and risky, due to more of the scheme being on the critical path.
- The likelihood of extending south of Lewisham is at risk, if the main drive site is located at Hither Green.
- New Cross Gate enables the best capability to extend to the best performing option for an extension beyond Lewisham – to Hayes, as the line can surface at Wearside Road depot and serve all existing Hayes line stations where they are currently situated.
- These strategies avoid environmental impacts arising from affecting Metropolitan Open Land at Catford, were that proposal successful through a consents process.





## Next Steps

- Our plan is to consult further on the BLE later in 2019 and include the sites identified for line-wide construction as part of this consultation.
- We have briefed Southwark and Lewisham Councils who have endorsed us engaging further on the scheme through public consultation.
- All three options considered will be presented alongside the pro's and cons of each.
- We will be engaging further with all other affected landowners including Network Rail and those in Catford.

