



Rail Accident Investigation Branch

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Dr C Menkiti
British Geotechnical Association at
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our ref: 0643

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Dear Dr Menkiti,

Re: Dangerous occurrence in railway tunnel

I am writing to request that you disseminate to your members some important safety learning found during our investigation of an incident in which construction equipment bored into a railway tunnel used by trains operating between the below-ground terminus at Moorgate in the City of London and Welwyn Garden City, Letchworth and Hertford North. Fortunately, a train driver saw water flowing from the roof of the tunnel, and train services were stopped, shortly before a CFA piling auger penetrated the tunnel and obstructed the railway (see attached illustrations).

Factors of particular relevance to geotechnical specialists and contributing to the developer and builder being unaware of the tunnel until the incident were:

- the tunnel, in common with some railway tunnels in urban areas, is omitted on most mapping, including all current and historic Ordnance Survey maps and plans. Although not relevant to the accident, maps showing underground railways often show a stylised, but incorrect, alignment;
- routine conveyancing searches undertaken when the developer purchased the site did not include the tunnel owner, Network Rail, because this organisation was not included in the options offered by the specialist conveyancing search provider;
- the developer proceeded without understanding the significance of a Land Registry entry for the development site stating '*so much of the sub-soil as was vested in the Great Northern and City Railway is excluded from the registration*' (this railway company no longer exists but its assets, including the incident tunnel, have passed to other railway organisations); and
- the structural engineer and construction contractors did not identify that an obstruction found in an exploratory borehole was part of a railway tunnel.

The RAIB has established that it is Ordnance Survey's policy not to show railway tunnels considered to be part of an 'underground system' on its maps. Those commissioning searches for sites in inner London (including Docklands) should therefore ensure that search providers consider Network Rail and Transport for London. Searches in central Newcastle

should consider the Tyne and Wear Metro (Tyne and Wear Passenger Transport Executive), and in central Glasgow, the Glasgow Subway (Strathclyde Partnership for Transport).

The incident illustrates the importance of ensuring that designers are aware of relevant land ownership issues. Full details are given in our report on the 'Penetration and obstruction of a tunnel between Old Street and Essex Road stations, London, 8 March 2013', which is available at: http://www.raib.gov.uk/publications/investigation_reports/reports_2014.cfm. The report includes recommendations intending to make information about tunnels more readily available.

The Rail Accident Investigation Branch is the UK's independent investigator of railway accidents, established by the Railways and Transport Safety Act 2003 and part of the Department for Transport. Our investigations are focused solely on achieving safety improvements; we do not apportion blame or liability and have no enforcement or prosecution role.

This letter has also been sent to the Association of Geotechnical and Geoenvironmental Specialists (AGS); the Engineering Group of the Geological Society; and the Ground Forum, requesting that they distribute it to their members.

Yours sincerely,



Chris Ford BSc DIC MSc CEng FICE
Principal Inspector of Rail Accidents



Figure 1: CFA auger sections found on the track after penetrating tunnel.

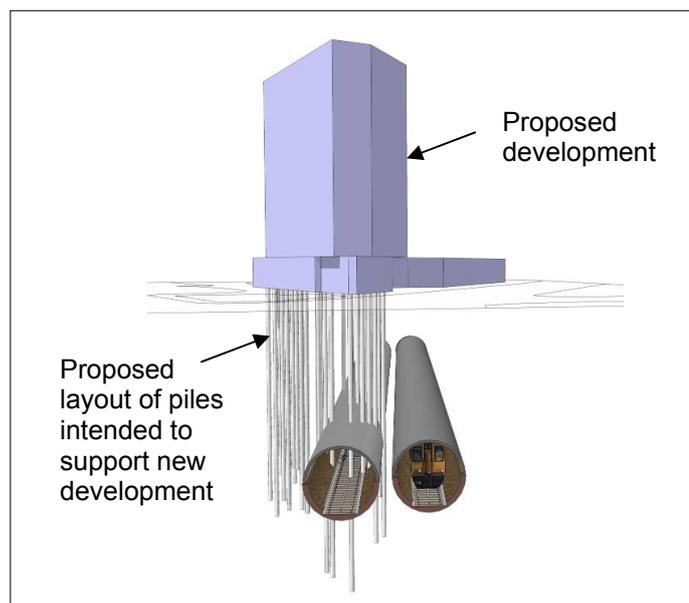


Figure 2: proposed foundation layout showing interaction with railway tunnel.