



CROSSRAIL INFORMATION PAPER

G3 – HANBURY STREET SHAFT

This paper explains how the decision to locate a shaft at Hanbury Street was reached and the revised proposals at Hanbury Street as a result of the revised tunnelling strategy.

It will be of particular relevance to those in the vicinity of the proposed Crossrail works at Hanbury Street.

This is not intended to replace or alter the text of the paper itself and it is important that you read the paper in order to have a full understanding of the subject. If you have any queries about this paper, please contact either your regular Petition Negotiator at CLRL or the Crossrail helpdesk, who will be able to direct your query to the relevant person at CLRL. The helpdesk can be reached at:

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APPROVED

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1. Introduction

- 1.1 The revised tunnelling strategy (see Information Paper D8, Tunnel Construction Methodology) removes the need to use the Hanbury Street shaft to launch tunnel boring machines (TBMs). As a result of this, a smaller shaft is required at Hanbury Street to house the tunnel ventilation equipment and for emergency intervention (see section 6 for further information).
- 1.2 Crossrail trains will run in twin bore running tunnels with an internal diameter of 6m between Liverpool Street and Whitechapel stations passing under the Spitalfields area at a depth of approximately 30m.
- 1.3 Both safety and operational considerations dictate that intermediate shafts are provided at a maximum spacing of 1 km (see Information Paper A4, Ventilation and Intervention Shafts). Therefore the 1.5km route length between Liverpool Street and Whitechapel stations requires an intermediate emergency intervention shaft to be located within the Spitalfields area.
- 1.4 The site selected for this ventilation and intervention shaft is 80–102 Hanbury Street together with the rear extensions of 61–67 Princelet Street. The worksite extends to occupy the car park of Britannia House (68-80 Hanbury Street) as shown in Annex A.
- 1.5 The use of an off-line shaft was rejected as a general principle by the London Fire and Emergency Planning Authority (LFEPA) who require a direct vertical connection to the surface for emergency intervention.

2. Tunnel alignment and the requirement for a shaft in Spitalfields

- 2.1 The alignment through the Spitalfields area was selected to:
- link fixed station points and alignments at Liverpool Street and Whitechapel stations;
 - meet Crossrail track alignment Design Standards;
 - meet operational performance requirements for the railway;
 - avoid the permanent acquisition of residential land; and
 - minimise both disruption and ground settlement during construction.
- 2.2 The requirement of an intermediate shaft between Liverpool Street and Whitechapel Station arises from the need to:
- provide intervention point(s) at a maximum of 1 km spacing between shafts along the route to satisfy Her Majesty's Railway Inspectorate (HMRI) and LFEPA requirements; and
 - provide ventilation to produce a safe environment that meets the operational requirements for the railway.

3. Shaft location options

3.1 The location of this intermediate shaft was identified following a review of eight options identified within the Spitalfields area for a combined ventilation and intervention shaft.

- Option 1: the cash and carry warehouse at 87 Hanbury Street;
- Option 2: the warehouse sites at 42 – 46 Princelet Street;
- Option 3: Brick Lane buildings on the corner of Brick Lane and Princelet Street;
- Option 4: the MGC Trading warehouse on the corner of Hanbury Street and Wilkes Street;
- Option 5: the corner of Corbet Place and Hanbury Street;
- Option 6: Woodseer Street;
- Option 7: Britannia House on Hanbury Street (including 80 – 102 Hanbury Street and the rear of 61 – 67 Princelet Street); and
- Option 8: Truman's Brewery bottling plant

The location of the above sites is show in the plan in Annex A.

4. Selection of shaft location

4.1 Further information on the Woodseer Street site vs the Hanbury Street site issue (as well on the issue of other, more southern, tunnel alignments through the area) can be found in Chapter 3 of Supplementary Environmental Statement 3 published in November 2006.

4.2 Option 1 was discounted as it results in a horizontal radius of 455 metres for the eastbound tunnel, which is the absolute minimum allowed by the project design standard for the design train speed. The location of this curve is outside the slower speed zones approaching and exiting stations and would result in unacceptable levels of track maintenance during the life of the project that could reduce the reliability of the railway. Additionally this option would remove a business that appears to form a significant element of the local supply chain to the Brick Lane area.

4.3 Option 2 and Option 3 were discounted due to the limited size and access to the site together with the environmental impacts on the conservation area, as a result of increased settlement risk to Christ Church.

4.4 Option 4 was discounted due to lack of space for the permanent operational facilities.

4.5 Corbet Place (Option 5) was discounted on the grounds of design complexity and cost as it required an unfavourable rail alignment, or would not provide a direct access for emergency intervention.

4.6 The Woodseer Street site (Option 6) was discounted as there is a higher risk of piled foundations intersecting the tunnels as the route was not safeguarded thus

permitting the piled foundations of new development to penetrate into the tunnel horizon. An off-line shaft was not acceptable as LFEPA require direct vertical access.

4.7 The Britannia House site (Option 7) is the preferred location for the combined intervention and ventilation shaft for the following reasons:

- it facilitates the design and construction of an acceptable railway alignment between the proposed Liverpool Street and Whitechapel stations minimising maintenance;
- it minimizes the impact of tunnel settlement on a conservation area (Christ Church) in the Spitalfields area and has no major conflict with known building foundations;
- it meets the requirements of HMRI's and LFEPA's for direct emergency intervention points;
- it enables the provision of a suitable worksite for construction of the shaft;
- it minimises impact on Brick Lane, relative to other shaft sites that have been reviewed; and
- it requires no permanent residential property acquisition and no long-term road closures.

4.8 Finally the Truman's Brewery bottling plant (Option 8) was discounted as alignments though this site either did not meet the project alignment design standards required to achieve acceptable maintenance levels during railway operation or passed beneath existing buildings with piled foundations of unknown depth which was considered too high a risk.

5. Elimination of the need for a TBM launch site in Spitalfields

5.1 The revised tunnelling strategy was developed by Crossrail, in particular, to address the concerns of residents in the Spitalfields area, and to reduce the interface with the Olympics construction at Pudding Mill Lane. This revised strategy eliminates the need to:

- construct a shaft at the Pedley Street site;
- construct a temporary tunnel to link the Hanbury Street and Pedley Street shafts;
- construct the conveyor alongside the Great Eastern main line viaduct;
- use Mile End Park to store excavated material; and
- use Devonshire Street sidings with the associated modification of the tracks.

5.2 As a result, the Promoter has given an undertaking¹ to Parliament that:

¹ House of Commons Select Committee - Transcript - Day 82 - Paragraphs 21687-21688. See transcripts at <http://www.publications.parliament.uk/pa/cm/cmcross.htm>.

“...the Promoter will not use the powers in the Bill...to construct temporary facilities for the removal of excavated tunnel material from Hanbury Street shaft, including the Pedley Street, adit and conveyors...”

5.3 With the revised tunnelling strategy the tunnels are constructed from launch sites at Royal Oak Portal, Pudding Mill Lane and the Limmo Peninsula (see Information Paper D8, Tunnel Construction Methodology). The original arrangement of the site at Hanbury Street and Pedley Street for the launching of TBMs is shown in Annex B, and the revised arrangement in Annex C.

6. Revised Hanbury Street shaft

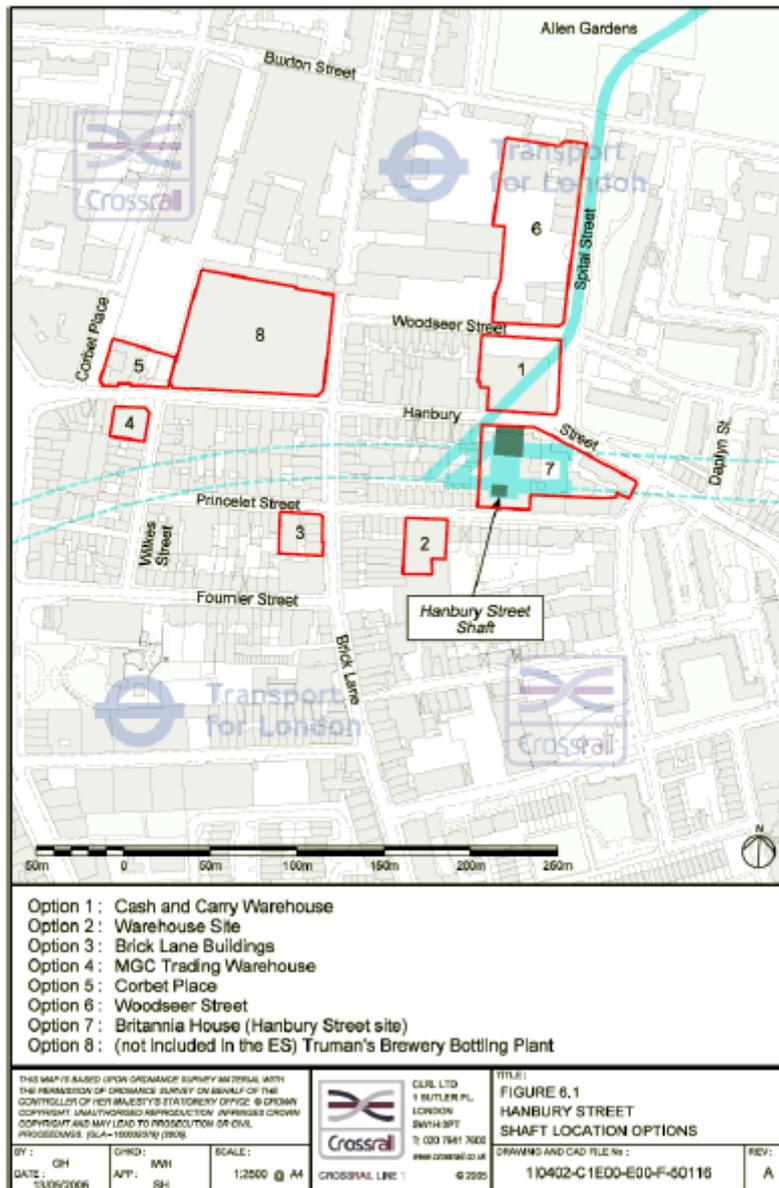
6.1 A shaft is still required at Hanbury Street to provide emergency intervention and accommodate tunnel ventilation equipment for the safe operation of the railway. The removal of the need for the shaft to be a TBM launch site for running tunnel construction has allowed a revised arrangement of the ventilation equipment, electrical and mechanical plant and intervention facilities to be developed.

6.2 The resulting shaft size is over 50% smaller than that required to launch TBMs. The smaller sized shaft can be constructed without the need to demolish Britannia House (although during construction it will be necessary to use its car park). The retention of Britannia House means that residents to the west of the shaft site will be screened from construction activities, and that there will be a reduction in the demolition noise impact and shaft construction impacts.

6.3 Finally, the Promoter has given an undertaking to the London Borough of Tower Hamlets that work will continue on the detailed ventilation and emergency intervention strategies for the Crossrail tunnels, and that that work will include consideration of whether the proposed Hanbury Street shaft is still required for either or both of these purposes. The Promoter has also undertaken, acting reasonably, to explore alternative possibilities which could obviate the need for an intervention shaft anywhere in Spitalfields.

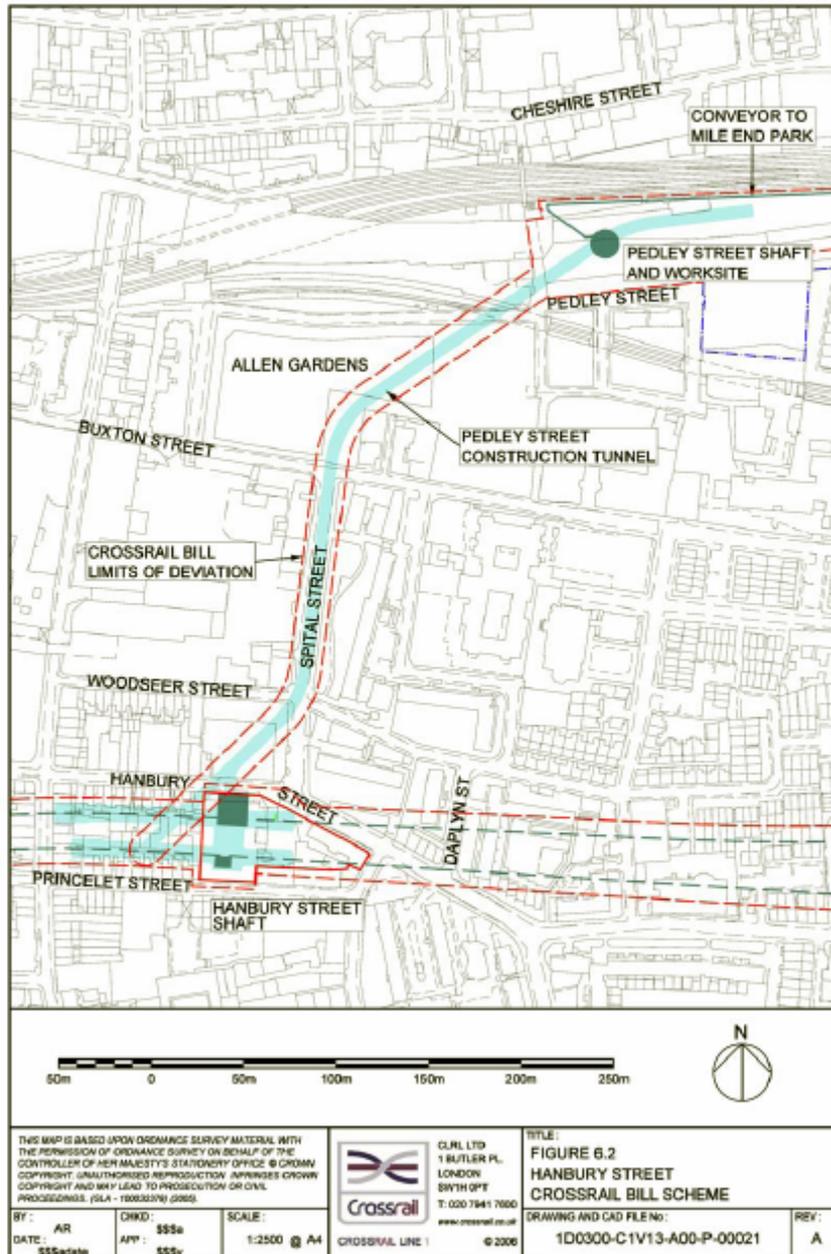
Annex A

Plan showing options considered for locating a shaft within the Spitalfields area



Annex B

Plan of Hanbury Street showing original construction proposals



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TITLE:
FIGURE 6.2
HANBURY STREET
CROSSRAIL BILL SCHEME
 DRAWING AND CAD FILE No:
 1D0300-C1V13-A00-P-00021
 REV: A

BY: AR
 DATE: 22/04/06
 CHKD: \$\$\$a
 APP: \$\$\$v
 SCALE: 1:2500 @ A4

Annex C

Plan of Hanbury Street showing revised construction proposals

