

# **ARCHAEOLOGICAL RECORDING ON THE HIGHBRIDGE STREET ENTRANCE TO THE WILCON HOMES SITE**

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## SUMMARY

In July 1998 recording of archaeological deposits within the two trenches dug during road-widening works at the Highbridge Street entrance to the former Royal Gunpowder Factory, Waltham Abbey, Essex, took place. The contractor's trenches exposed foundations and limited upstanding remains of buildings associated with the former Saltpetre Refinery on the site. There was evidence for parts of the Refinery itself and the Crystallising House from both the pre-1783 and 1801-6 phases of the works. Later structures and features were also recorded.

## 1 INTRODUCTION

- 1.1 Archaeological deposits revealed within the trenches being dug during road-widening works at the Wilcon Homes site on Highbridge Street, Waltham Abbey, Essex (NGR TL 37690057) (Figures 1 and 2) were recorded during July and August 1998 (Figures 1 and 2). The presence of archaeology, in particular an edge-runner from a gunpowder incorporating mill, was reported to Steve Chaddock, the Archaeological Advisor to WARGM, by staff of the Lee Valley Regional Park Authority. The author was then engaged to record the visible archaeology, the work on which took place during the week beginning 6 July 1998. Further observations were made during the week beginning 3 August 1998.
- 1.2 The recording, approved by Shane Gould of the Essex County Council Archaeology Advisory Group, consisted of an overall plan of each trench and measured sections where necessary, as well as a photographic record comprising colour prints and colour transparencies. All features and photographs taken were registered using WARGM *pro forma* recording sheets – examples are presented as Appendix 1.
- 1.3 The aim of the work was to record all archaeology revealed by the contractor's excavations, particularly buried structures relating to the former Royal Gunpowder Factory. Priority was given to recording the remains of structures although soil colour changes were noted in each trench. This work links to the evaluation and excavation carried out by the Hertfordshire Archaeological Trust (HAT) (Murray 1998; Vaughan & Murray 1998).

## 2 DESCRIPTION OF THE SITE

- 2.1 The site comprised two trenches adjacent to Highbridge Street outside the present entrance to Wilcon Homes site. Two trenches (numbered during the recording as A and B) had been excavated by the contractor, Deadline, and were recorded following excavation; these lie outside the area of the Highbridge Street Scheduled Ancient Monument. No previous archaeological work has been carried out on the area

although an evaluation and subsequent excavation were carried out immediately to the north within the Highbridge Street Scheduled Ancient Monument number, 21567/2 (Chaddock 1997; Vaughan & Murray 1998; Murray 1998). Highbridge Street is the main thoroughfare between Waltham Abbey and Waltham Cross, and its name may derive from the highbridges over both the Millhead Stream which was necessary as canal traffic and a railway ran under the road from the North Site to the Lower Island Works and the South Site (Plate 1), and the River Lea navigation.

- 2.2 The geology of the site is mixed river gravels overlying London Clay. Soils in the vicinity are a stoneless clayey river alluvium, although much of the soils in the trenches derived from post-medieval activity (construction trenches for walls, laying of services, etc.). The site is located at a height of 19m AOD on the flat land in the flood plain of the River Lea (Murray, 1998, 4).

### 3 Trench A (Figure 3)

- 3.1 Trench A was L-shaped in plan and measured 20x16m. Much of the southern half of the trench contained service pipes and at least one pipe, aligned north-south, was present in the western half of the trench. In the undisturbed areas six features were recorded.

- 3.2 Features 1 and 3 were deposits of brick. Feature 1 comprised three courses of bricks, with the lower course set into concrete (Feature 2) at a north-west - south-east alignment; this measured 1.20x0.30m. The bricks included red stock and engineering bricks, all measuring 23x10x7cm; tile was also present. Feature 3 comprised three bricks laid in header bond set into the concrete of Feature 2. The full extent of the bricks was not visible but they appeared to be of the size 23x11x7cm; the feature measured 0.50x0.20m. Although these features may represent the foundation of a building, it is more likely that these were a build-up deposit for a concrete layer that is visible in the section of the trench. This appears to be modern and associated with the construction of the kerbing and pavement.

- 3.3 Feature 2 was a pad of concrete, comprising two blocks measuring 2.30x0.70m and 1.8x0.50m. A further small detached patch of concrete south of the pipes may also be associated with this feature. This feature was a capping over a joint in the water main. The jointing was necessary in order to raise the piping to a height just under the old high bridge. The capping kept the pressure high through the joint.

- 3.4 Feature 4 was a brick wall, with ten courses of brickwork surviving in the section of the trench, and as a foundation in the base of the trench; the wall ran for 1.2m within the trench, although the foundation continued for a further 1.2m. The wall was built of red stock and engineering bricks, each measuring 23x11x7cm, and was bonded with a hard white thickly-laid mortar containing inclusions. The wall was laid on basal course of tile, which itself sat on a timber-planking raft, although this was poorly preserved. Above the tile course there is one course of bricks whose bonding is not visible. Above this, and corbelled in half a stretcher (c12cm), were three courses of brick. The lower course was laid in Flemish bond, the middle course in header bond, and the top course was probably also in Flemish bond. Above this, again corbelled in by half a stretcher, were another six courses, all in header bond. Further observations

in August confirmed that the line of Feature 4 continued east. The south-eastern corner of the building was also noted, as was the southern wall of a short-lived extension, built between 1801 and 1806.

- 3.5** Feature 5 was another brick feature and like the other features only part of the structure was revealed within the limits of the trench. It comprised a course of red stocks and engineering bricks, each measuring 17x9x5cm, laid on their sides in header bond forming an edge to a rectilinear structure (though its exact shape could not be recognised given the constraints of the trench size). The bricks were bonded with a soft cream mortar. The inner part of the structure had been disturbed by the contractor's machine, although appeared to have been a flat surface, with bricks laid on their sides in a header bond aligned east-west. Four further courses of truncated brickwork were visible in the section. This feature may be a base for machinery, although it could also be some form of underground structure such as a well or a sump. It should be noted that the millstone fragment was recovered from the vicinity of this feature.
- 3.6** Feature 6 was a wall foundation running north-south for seven metres through the trench, with a few courses above this level remaining at the northern end. The wall had been truncated by services at the southern end and had been disturbed by the contractor's machine in the centre of the trench. On the northern half of the wall three courses of brick were visible, with an extra two courses visible in the section of the trench at the extreme northern end. The latter two courses were laid in header bond. The foundation rested on a timber-planked raft consisting of two planks of wood laid adjacent to each other; each measured 0.36m in width and 0.005m in height. On top of the planking was a course of five bricks laid in Flemish bond. This underlaid another course of three bricks in Flemish bond, though slightly offset from centre to the west. This level represents the top of the surface as removed by the contractor. Above this level was a course laid in header bond. At this level on the northern half of the wall, there is a layer of red mortar (half a stretcher in depth) on the western face. The courses above this at the southern end are described above. All the bricks were red stock and were, with the exception of the course mentioned above, mortared with a thickly-laid hard white mortar containing inclusions.

#### **4 Trench B (Figure 4)**

- 4.1** Trench B was also L-shaped in plan and measured 20x12m. The southern half of the trench beyond a gas main was devoid of any archaeological deposits. In the northern half of the trench six features were recorded.
- 4.2** Feature 1 was part of a brick wall comprising six courses of yellow brick, each measuring 23x11x7cm, laid in stretcher bond. These were laid on a rubble foundation, 0.40m deep, which contained both yellow stock and engineering brick. This was a relatively modern wall, as it overlies Feature 3.
- 4.3** Features 2 and 3 were part of the same building. Feature 2 was identified as a brick structure, and Feature 3 as a foundation for the same building. The upstanding wall (Feature 2) measured 2.2x0.70xc1m, and comprised nine courses of brickwork, containing mainly red stock with a few engineering bricks; both measured

23x11x7cm. They were bonded together with a thickly-laid hard mortar containing inclusions. The wall had been heavily disturbed by the machine and the bonding pattern was not identifiable. The wall contained a drain on its south side, measuring 0.135x0.14m in section, which curved from inside the wall to the southern face. The foundation was laid directly on clay and consisted of one course of red stock. In plan, the foundation represents an east-west running wall (of which Feature 2 is at the western end). To the north of (and contemporary with) the wall were two further wall foundations running north-south. All were laid in various patterns of header and stretcher bonds, and were mortared with a soft cream mortar. The construction trench was backfilled with dark-grey greasy clay.

- 4.4 Feature 4 was part of another east-west running wall constructed with engineering bricks, each measuring 23x11x7cm. The wall had been heavily disturbed by the contractor's machine, although it appears to have been laid in stretcher bond, and was one stretcher-length thick. The bricks were bonded with a hard white mortar.
- 4.5 Feature 5 was a drain running east-west and located just north of Feature 4. It was constructed of yellow stock, each measuring 23x11x7cm, and was set on a thick layer of a cream-coloured mortar. A special yellow brick made to bridge the gap, which measures 0.13x0.25m in section, capped the drain.
- 4.6 Feature 6 was an east-west running wall constructed of red stock, each measuring 23x11x7cm, bonded by a soft cream-coloured mortar containing inclusions. The wall has been heavily truncated by the adjacent gas main, which ran parallel to the wall, and by the present excavation of the trench. The wall rested on a course of bricks, each measuring 18x4.5x8.5cm, which were laid on a raft of timber planking; the latter was poorly preserved. In general, the wall itself appears to be constructed in a version of Flemish bond with a stretcher either side of a standard Flemish bond. This was particularly visible near the middle of the trench, although at the western end the wall seems to have been laid only in a single Flemish bond. Where the wall was visible in the eastern half of the trench, it was constructed as a line of bricks in header bond with varying bonds behind. These included a row in stretcher bond, a row in header bond, and an area with a brick laid on its side, tiles, as well as rubble infill.

## 5 Artefacts

- 5.1 No stratified artefacts were recovered from the excavation. The only item of interest was the fragment of a gunpowder incorporating millstone, which was found in, and subsequently lifted by the contractor from, trench A. A few pieces of cow bone and horn, some clay pipe stems, and some unidentifiable iron objects were removed by the contractor from unstratified contents in trench B. None were retained, except the millstone which has been accessioned with a WANS98 code.

## 6 Discussion

- 6.1 Trench A revealed a number of service pipes, one of which, a water main, was capped by a layer of concrete (Feature 2) laid to maintain high pressure within the pipe at a weak joint. This jointing of the pipes was necessary because of the need to gain height



to cross the Millhead stream, east of the excavation. The extent of the height needed can be seen in the plans and photographs in Jenkins' article on the railways of the Royal Gunpowder Factory (Jenkins, 1989, 396-397) (Plate 1).

- 6.2 The two walls in this trench (Features 4 and 6) appear to be part of the same building, although the exact relationship between them has been lost, and their construction differs slightly. Parts of the southern and western walls were recorded, as well as the southern wall of an extension dating to between 1801 and 1806. The remains are likely to be part of the early Saltpetre Crystallising House [RCHME 311], which was constructed before 1783 (RCHME 1994, 67-68). The building was aligned north-north-west to south-south-east, and is depicted on maps dated between 1783 and 1806 (WASC 900/1, WASC 900/58 and WO78.1352). A badly robbed wall (Feature 2026) recorded in the 1998 HAT excavation (trench 3) would appear to be a continuation of this building (Murray 1998, 9, Figure 5).
- 6.3 If Features 4 and 6 were part of the same structure, then Feature 5 could be located inside the building, and could be associated with saltpetre refining at this date. Both interpretations given in section 3.5 could be valid, and the feature could be a foundation for a tank, or a sump to hold run-off water from the crystallising process (cf Fitzgerald produced as Appendix 2).
- 6.4 In trench B, the walls comprising Features 1 and 4 are parts of modern buildings, although their exact dates and purposes are unknown. They are late in the sequence of features recorded, and may be the foundations and lower courses of the walls of the timber store shown on a 1923 map (WASC 900/84).
- 6.5 Features 2 and 3, and 6 are foundations for two earlier buildings. The exact nature and date of these buildings are unknown, although some interpretations can be put forward. Feature 6 is a foundation wall for part of a building marked as a Crystallising House on an 1827 map (surveyed 1821: WASC 900/4). It would appear from the cartographic evidence that the early Crystallising House ([RCHME 311] dating from pre-1783 and recorded in Trench A) was demolished between 1806 and 1827, and the process was transferred to building [291a] recorded in 1998 as Feature 6. Features 2 and 3 are foundations and part of the wall of a building, which was built as part of the Saltpetre Refinery between 1801 and 1806.
- 6.6 Overall, recording of the two trenches has added new information about the construction of buildings associated with the Saltpetre Refinery dating from the last quarter of the eighteenth century, which probably includes Crystallising Houses dating from pre-1783 and c1806, and a Saltpetre Refinery building dating from 1801-6. In summary, this recording exercise, which combined with the evaluation and excavation carried out by the HAT, has revealed important information on the early archaeology of the Royal Gunpowder Factory, in particular the Saltpetre Refinery, as well as demonstrating the more wide-ranging history of the southern part of area H.

## 7 Archive

- 7.1 The archive, including original field drawings, photographs, and photographic registers, is held by the WARGM Co Ltd at Waltham Abbey.

## 8 Acknowledgements

- 8.1 The author would like to thank Wilcon Homes Ltd for their co-operation and for permission to carry out the recording. In particular, thanks are due to their contractor, Deadline, and to the Wilcon contracts manager. The author is also grateful to Steve Chaddock, Archaeological Advisor to WARGM Co Ltd, for his comments on the text, and to the staff of the Lee Valley Regional Park Authority for alerting Steve Chaddock to the presence of the archaeology.

## 9 References

### *Unpublished Sources*

#### *Maps (WASC prefixes held at WARGM)*

WASC 900/1	1783	10 chains to approx 2.85"
WASC 900/58	1801	scale unknown
WASC 900/4	1827	200' to 1"
WASC 900/84	1923	1:2500

WO 78/1352            1806    scale unknown

Crawter's Map        1826

### *Bibliography*

Chaddock, S, 1997 *Desktop evaluation of the possible remains at Highbridge Street SAM, Waltham Abbey, Essex*

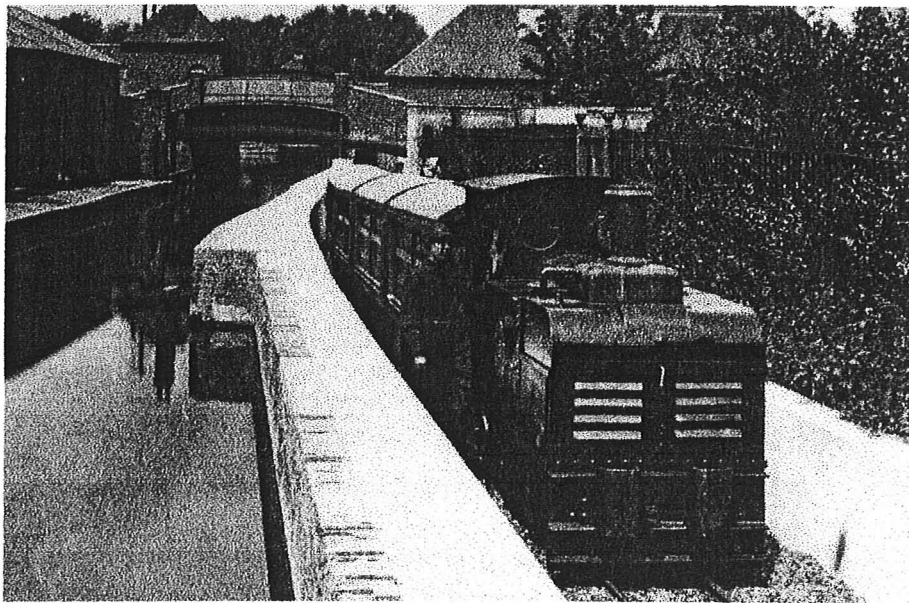
Fitzgerald, W, 1895 How explosives are Made *The Strand Magazine* IX 308-318

Jenkins, J M, 1989 The Railways of the Royal Gunpowder Factory, Waltham Abbey *Industrial Railway Record* 117 385-415

Murray, J, 1998 *Former Royal Gunpowder Factory Highbridge Street SAM, Waltham Abbey, Essex: Archaeological Observation & Recording* HAT Report 342

RCHME, 1994 *The Royal Gunpowder Factory, Waltham Abbey, Essex: An RCHME Survey 1993* (Swindon: RCHME)

Vaughan, T & Murray, J, 1998 *Waltham Abbey Royal Gunpowder Mills (Former RARDE North Site) Access Road: an archaeological evaluation* HAT Report 324



**Plate 1. Photograph showing Highbridge Street running over the railway and Millhead Stream (Jenkins 1989, 396).**



**Appendix 1 – WARGM Recording Sheets**

Site	Year		Date	
Site Code	Trench	Category	phase	Context
Colour		Consistence		
Texture		Coarse Components		
Co-ordinates	Length	Width	Diameter	Height/Depth
Description				Matrix
Below	Filled With		Cut By	
Above	Comprised Of		Cuts	
Later Than	Componant Of		Against	
Earlier Than	Associated With		Butts	
Equivalent To	Bonded To		Butted By	
Same As	Uncertain		Other	
Interpretation				
% Sieved	Plans Sheet/Drawing No.		Sections Sheet/Drawing No.	
Volume Sieved (litres)				
% Soil Sampled				
Volume Sampled (litres)				
Method of Excavation	Photographs		Reliability	

Site Code		Film No.	ASA		Film Type	
Exp. No.	Subject	Direction	Scale	Date	Initials	
1						
2						
3						
4						
5						
6						
7						
8						
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## Appendix 2 – extract from William Fitzgerald’s article in *The Strand Magazine*

In 1895 William Fitzgerald published an article in *The Strand Magazine* (Fitzgerald 1895), entitled ‘How Explosives are Made’. The article was written as though the reader was being given a tour of the Royal Gunpowder Factory. Although written in 1895 at a time when the production of gunpowder was in demise, it nevertheless provides a useful summary of the refining of saltpetre.

The saltpetre comes from Scinde in bags of 100lb., and in this state it contains about 5 per cent. of impurities. It is dissolved in large quantities in water heated to 230 degrees, and after careful skimming, the solution is pumped into the coolers shown in No. 2 [photograph not reproduced here]. The saltpetre crystallises in these coolers, and is then raked from the bottom in the form of wet snow, which is piled up, and subsequently undergoes a washing process by means of a continuous stream of water. There are four refining coppers and seven evaporating pots in the refining room. The saltpetre is ultimately sent to the mixing-house in barrels, with a certificate showing that it contains between 3 and 6 per cent. of water. The saltpetre refuse is bought by farmers for from 8s to 12s per ton.

The above text describes two processes – the dissolving of saltpetre and the crystallising or evaporating of saltpetre. The archaeological and cartographic evidence suggests that these two processes occurred in different buildings. Parts of these buildings were found in the 1998 excavations. The pre-1783 crystallising house was recorded in the HAT excavation and in the present excavation. The early-nineteenth-century crystallising house and another structure, probably the building for dissolving saltpetre was also located.

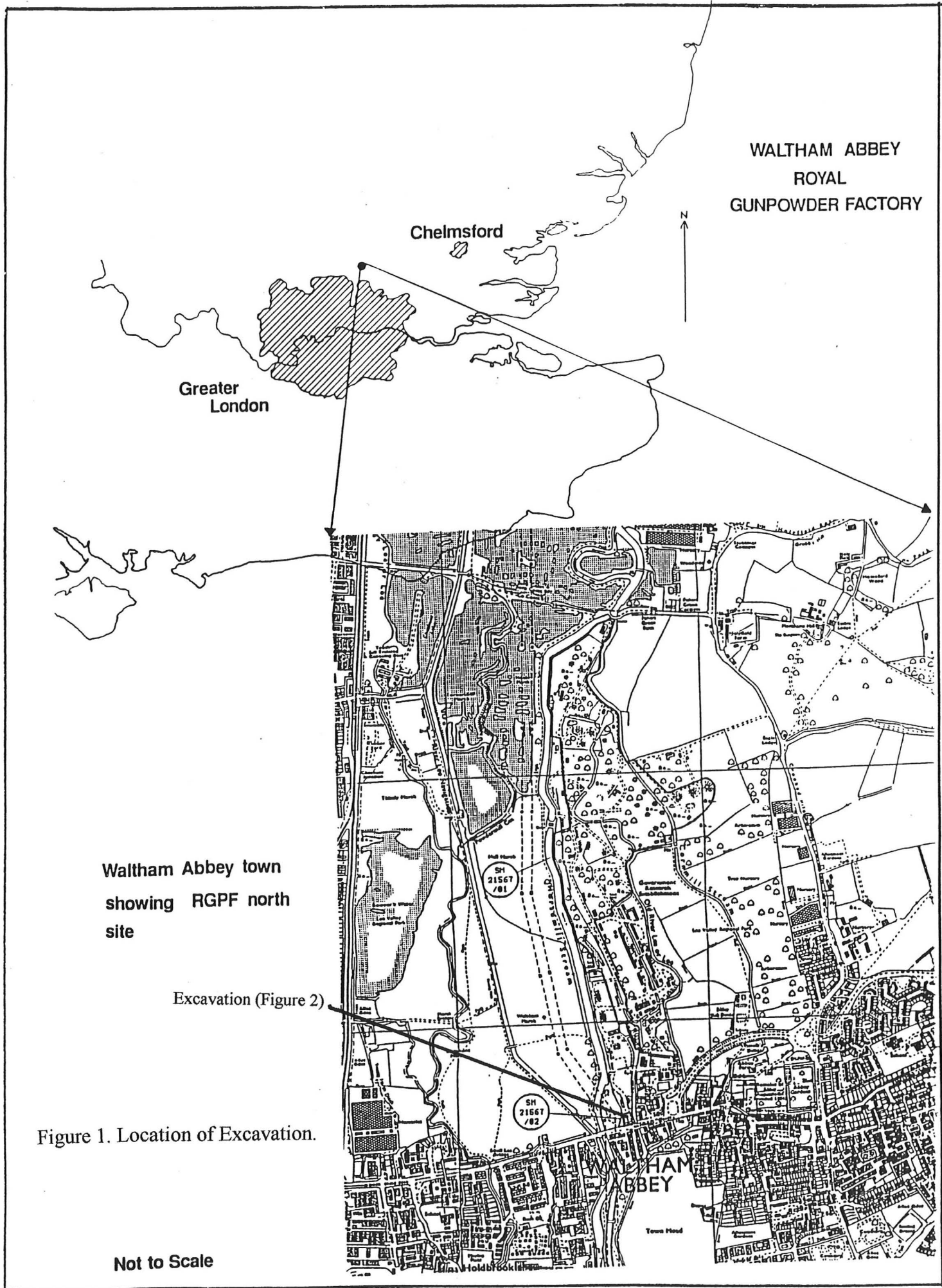


Figure 1. Location of Excavation.

Not to Scale

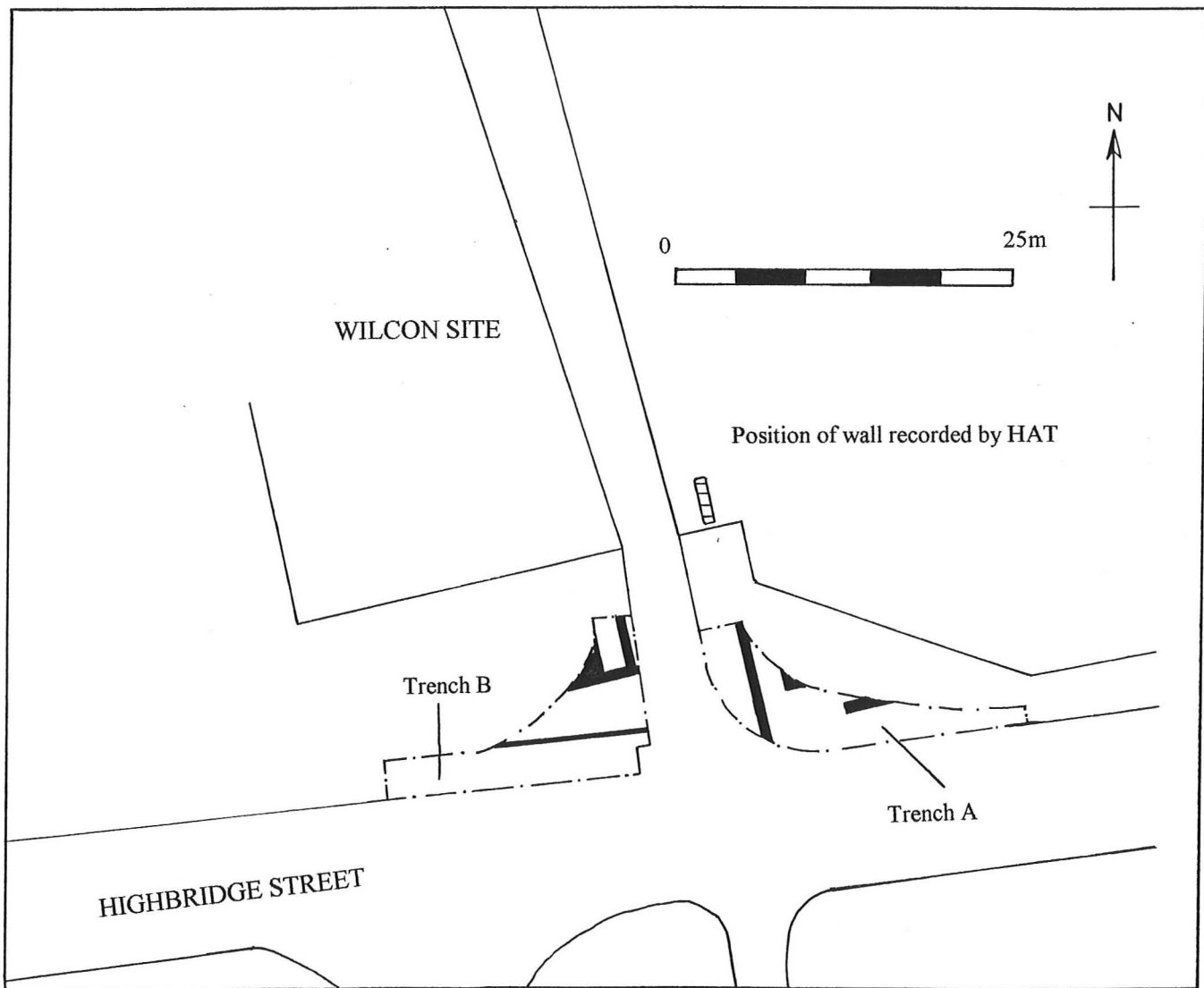


Figure 2. Trench Plan with Summary of Features.



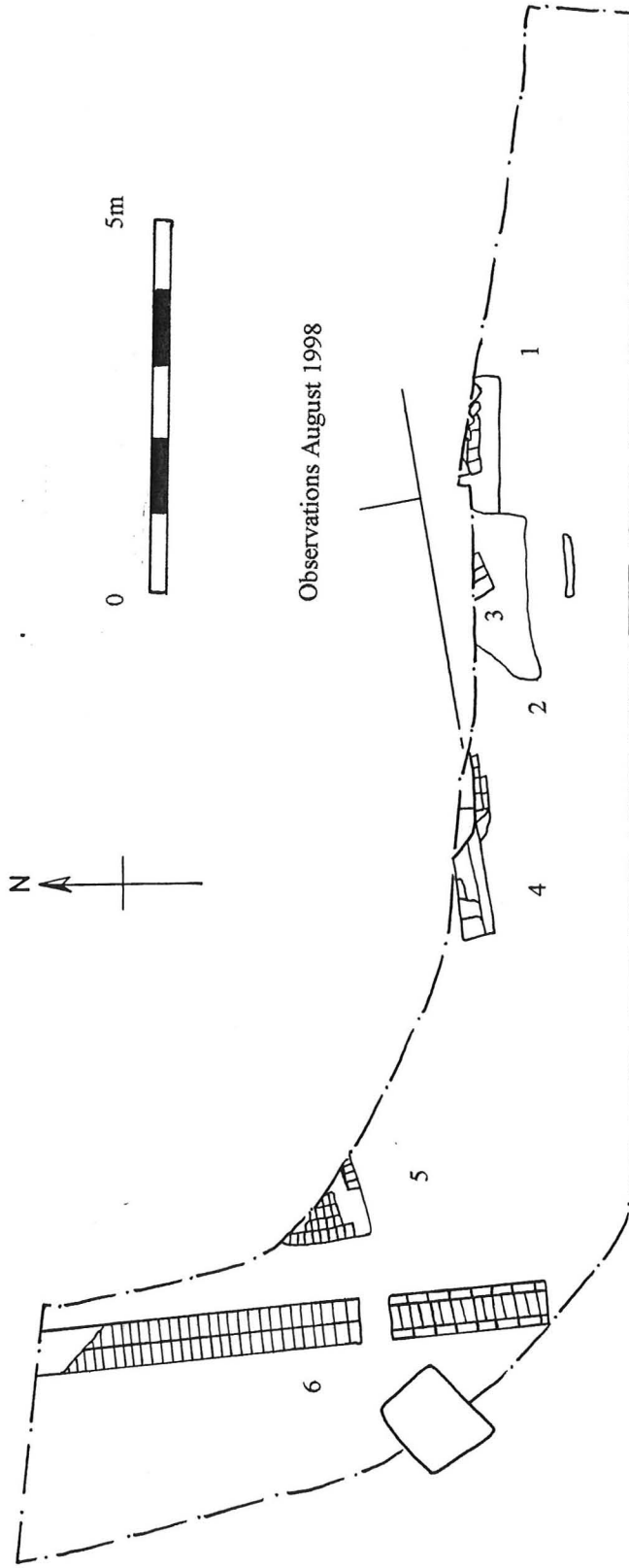


Figure 3. Plan of Trench A.

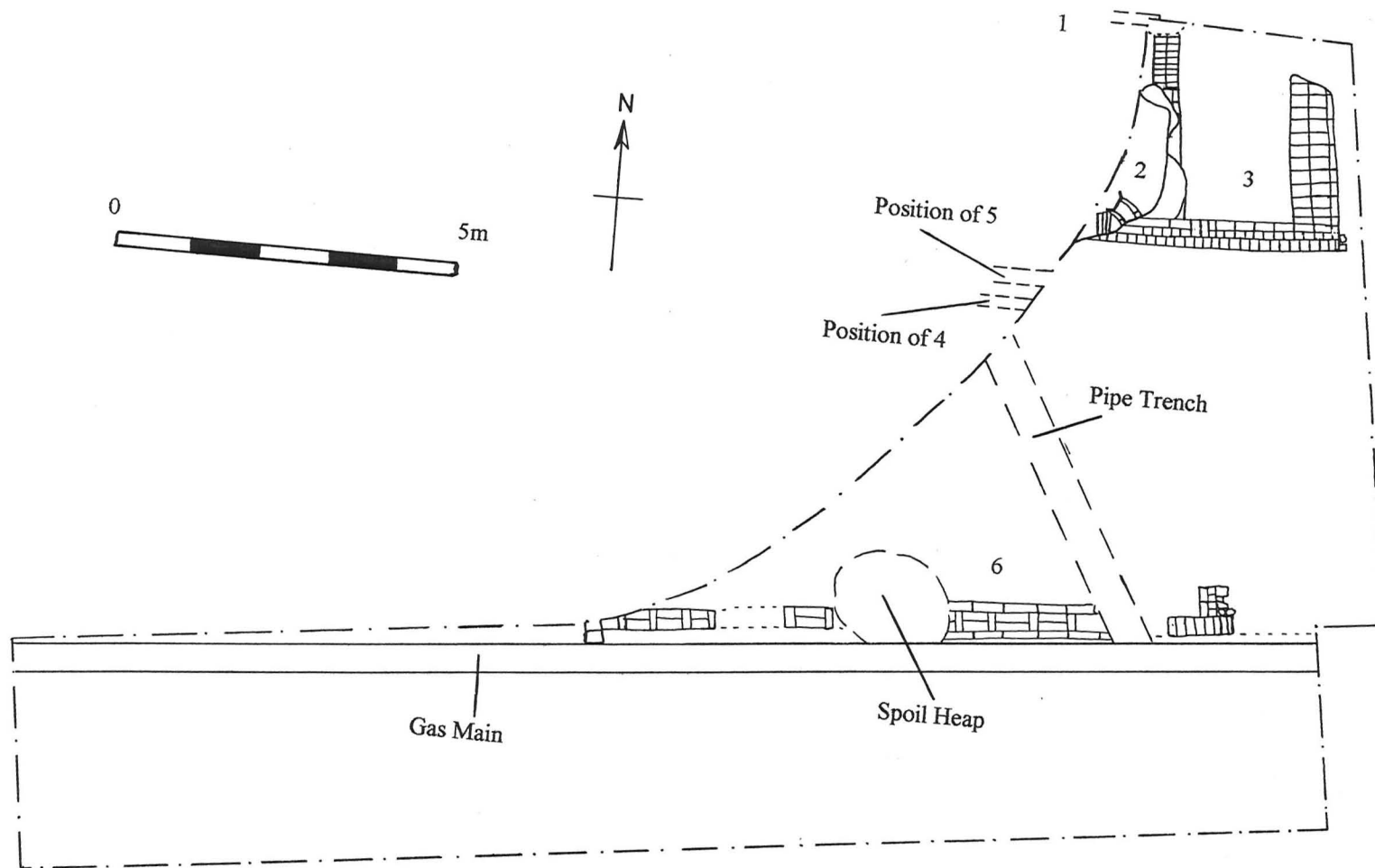


Figure 4. Plan of Trench B.