Archaeological Excavations at Whitemoor Marshalling Yard, March

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Whitemoor Marshalling Yard at March in Cambridgeshire was one of the largest and most important marshalling yards in the UK, and was a site of technical innovation, including Britain's first 'mechanised hump' marshalling yard. Although abandoned in the 1990s, the redevelopment of the site by Network Rail has provided an opportunity to re-examine the history and development of the site, which included the archaeological excavation of the remains of some of the buried railway structures. In addition, this work has revealed evidence for some of the early history of the site, including possible Iron Age features and part of a Romano-British field system.

Project Background

In 2010 Wardell Armstrong Archaeology (formerly North Pennines Archaeology) were commissioned by Wardell Armstrong LLP, on behalf of their clients Network Rail, to undertake an archaeological trial trench evaluation and subsequent open area excavation of land at the former Whitemoor Marshalling Yard, March, Cambridgeshire (NGR TL 4123 7873) (Figures 1 and 2). The work was undertaken at the request of Kasia Gdaniec, Senior Archaeologist at the Cambridgeshire Archaeology Planning and Countryside Advice service (CAPCA), and formed a condition attached to a Planning Application Consent for the redevelopment of the site as a National Track Materials Recycling Centre (NTMRC).

A previous archaeological appraisal of the site (Jacobs 2008) demonstrated that the site had considerable archaeological potential in terms of its proximity to known Romano-British sites, whilst the 19th and 20th century railway yards themselves were considered to be of regional and national significance. The yard was once one of the biggest and busiest in Europe, and the site was expected to contain the remains of Britain's first mechanised gravity 'hump'. A topographic survey of the site undertaken by North Pennines Archaeology Ltd in 2010 emphasised the survival, at surface and sub-surface level, of many of the structures associated with one of the railway yards (Railton 2010).

The subsequent evaluation involved the excavation of 65 trenches, which identified significant archaeological remains. In general terms, the archaeological remains consisted of concentrations of Romano-British features, which had survived later developments in several areas of the site, together with the remains of parts of the railway yard infrastructure that had escaped the post-closure programme of demolition and salvage. Of particular importance were a series of Romano-British features believed to be associated with the Fen Causeway Roman Road and the remains of two 20th century railway turntables (Cavanagh 2011).

Following the completion of the trial trench evaluation, a programme of archaeological mitigation, consisting of a series of open area excavations, was immediately implemented. The open area excavations focused upon a series of Romano-British ditches on the south side of the site, believed to be associated with the Fen Causeway Roman Road, and an area of intense Romano-British activity at the centre of the site. The northern end of the 20th century Gravity Hump was also investigated, and the full excavation of both the railway turntables was undertaken (Cavanagh 2011). During this work open days were held at the site, which attracted a significant amount of interest from the public, including a number of previous employees, who provided valuable insights into the interpretation of the railway features investigated.

Historical Background

The earliest evidence for occupation of the March area is a collection of Mesolithic and Neolithic flint tools discovered in the 1920s near Gaul Road, 2km south-west of Whitemoor Marshalling Yard, which were supplemented by discoveries made during fieldwork in the late 1970s and early 1980s (Jacobs 2008). Late Mesolithic to Early Neolithic worked flints were also recovered during a recent evaluation to the west of Hundred Road (Hutton and Standring 2008). During this late Mesolithic and Early Neolithic period, March was an island surrounded by shallow salt water lagoons that may have been exploited for wildfowl and fish (Jacobs 2008).

Proceedings of the Cambridge Antiquarian Society CII pp. 111–128.

Throughout the Early Bronze Age, the land around the March island was subjected to a major inundation, leading to prolonged periods of isolation from the mainland. Bronze Age sites and finds are therefore confined mostly to the higher ground of the larger fen islands and the fringes of the mainland. The inundation was followed by the beginnings of peat growth, a process which continued into the Iron Age. Most of the marine deposits surrounding the islands developed a covering of peat and a number of sites dating from this period are known, including Flaggrass Hill (a raised part of the March island) located 1km north-east of the site. As well as producing salt from the brackish water in the remaining tidal lagoons, this site may also have exploited a river channel that existed at this time as a transport link to nearby settlements on Stonea Island to the south (Jacobs 2008).

Although transport and communications during the Iron Age were dependent mostly on boats, timber trackways were constructed between many of the fen islands, including a predecessor of the Roman Fen Causeway which linked the mainland at Fengate with Denver in Norfolk (Malim 2000, 11).

Roman-British activity in the area included the construction of a fort at Grandford, approximately 2km to north-west of March, in response to the Boudiccan revolt of AD 61. The Fen Causeway appears to have been established or developed as a major supply route at around this time. This feature was the principal east to west route in the Roman period across the East Anglian Fens in the counties of Cambridgeshire and Norfolk. The road largely consists of a thick spread of sandy gravel, and takes an eccentric course for much of its length, often diverting to take advantage of islands of solid ground. The Causeway branches out of a complex of roads lying north of the river Nene and the village of Castor. It then heads east until its course is lost beneath modern Peterborough, before re-emerging as it crosses the Fengate complex, a substantial prehistoric and Romano-British settlement, which may have been abandoned by the time of the road's construction. The Causeway then stretches out onto the peat of the Flag Fen basin, continuing east to the more solid ground of Whittlesey Island. The course then passes north of Eastrea and onto Coates before entering the fen proper at Eldernell and crossing in a straight line to March island, before hitting solid ground once more at Grandford. It is therefore clear that the Fen Causeway needed to be constructed as two general types of road: the dry land sections, where it would have been built with little difficulty across the gravel islands of the fen landscape, and the more difficult sections across the fen (Fincham 1998, 19). At March, the Fen Causeway has been identified as a large earthwork which crosses the fen from Peterborough, and then continues across the edge of the Terrington Bed silts to Norfolk. Its course, in two lengths either side of March, is straight and at the Peterborough end there is a limestone spread of 'metalling' on the surface, whilst elsewhere the surfacing has a cover of gravel (Hall 1987, 41).

The fertile fen silts around March were extensively farmed during the Roman period and a large number of cropmarks representing a widespread system of field ditches are known from the area surround-

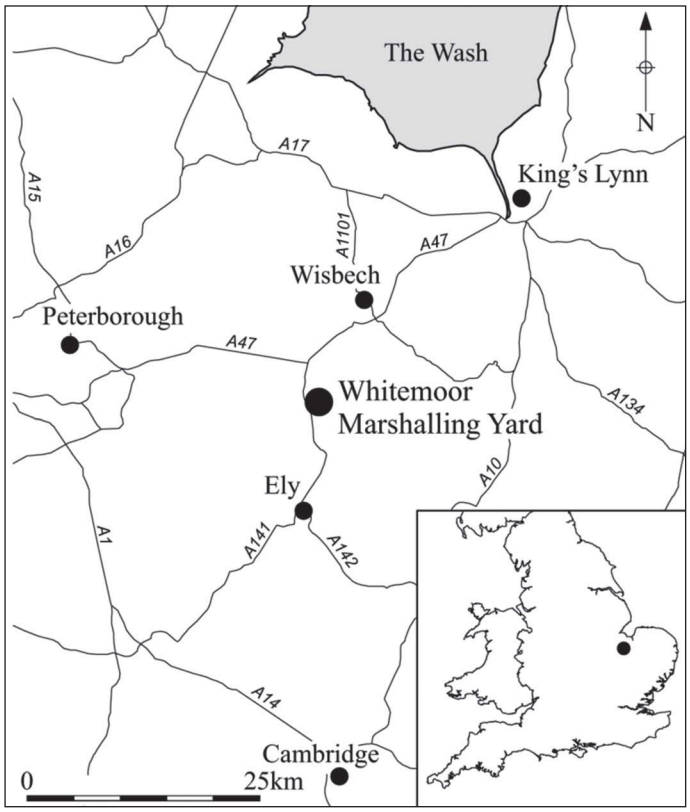


Figure 1. Site location.

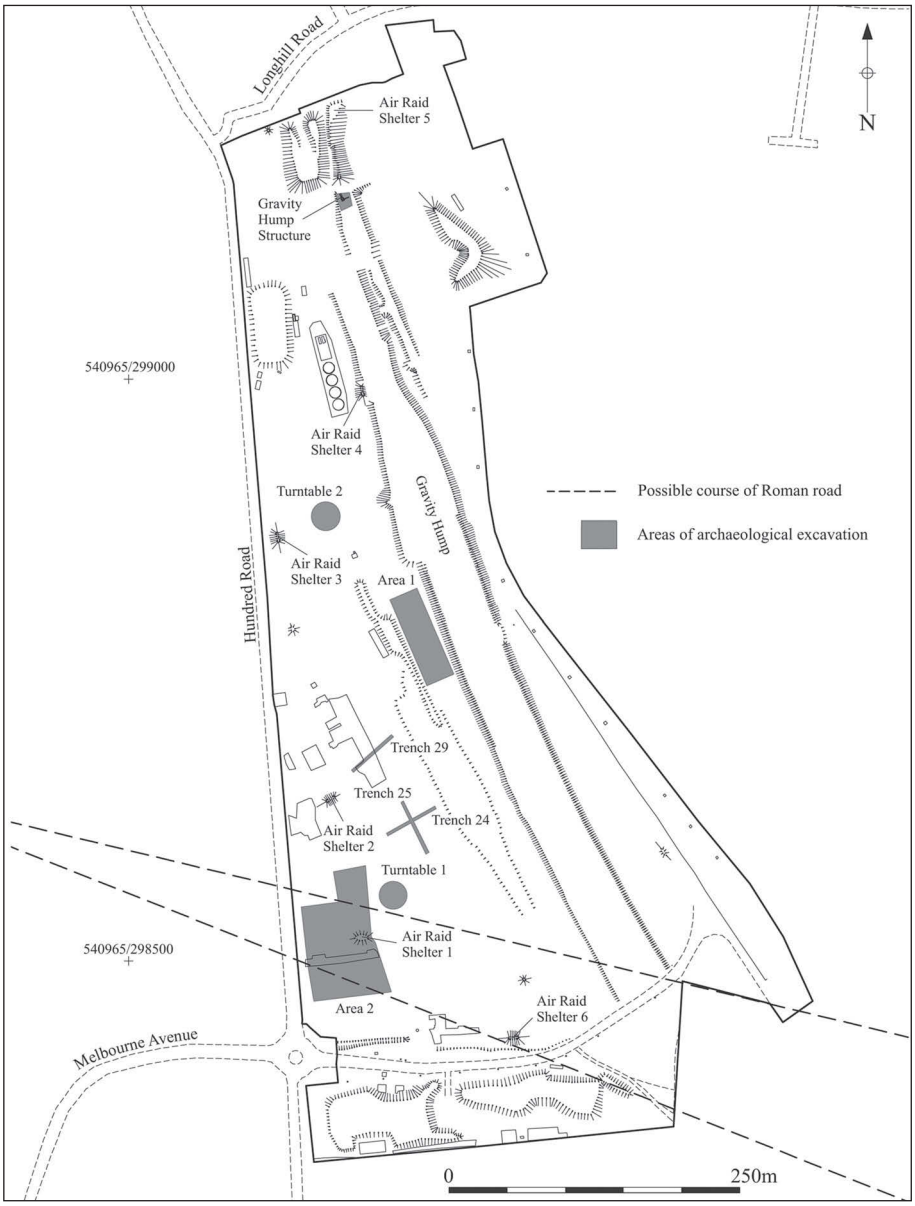


Figure 2. *Site plan showing areas of investigation.*

ing the Whitemoor Marshalling Yard. Closer to the site, investigation of cropmarks on the west side of Hundred Road revealed the presence of a number of field ditches, although no dating evidence was recovered. Comparison to similar sites in the region suggests that they are Roman in date (Hall 2004, 3). Salt production continued into the Roman period as is evidenced by the discovery of a settlement and saltern during excavations at Longhill Road, 180m north-east of the site. This site may have been established during the late Iron Age and lasted until the early 3rd century AD when it may have been abandoned due to changes in water level (Atkins 2003). Evaluations carried out in advance of Phase 1 of redevelopment at Whitemoor revealed the truncated remains of occupation sites dating from the early Romano-British Period (Hall 2004).

The name March is recorded in the Domesday Book of 1086 as *Merc*, a derivation of the Old English *Maerc*, meaning (*the place at the*) *boundary* (Mills 1991, 318). No Saxon finds are known from March itself, although this may be due to the movement of the main settlement focus approximately 3km to the south to its present position in the pre-Conquest period as a result of fenland drainage and improvement schemes instigated by the Abbots of Ely. In the post-Conquest period Ely became a cathedral city in 1109 with extensive estates in the area. The settlement pattern in this period was characterised by dispersed villages and isolated farmsteads, especially across the more accessible silt land around the former fen islands such as March and Wisbech. Further drainage improvements and river canalisations stimulated the growth of water-borne trade and by the 16th century March had

developed into a minor port (Pugh 1967, 117).

During the early post-medieval period there was continuing improvement and drainage of the fens, most notably through the General Drainage Act of 1600. However, March itself failed to prosper, with the biannual fairs and a market that were granted in 1670 having lapsed by 1790 (Pugh 1967, 116). In these conditions, the arrival of the railway in 1846 gave the impetus to a rapid expansion of March into a thriving market town.

The first railway line had opened to freight traffic in December 1846, and in 1847 the original station opened and the passenger service commenced, the line being operated by Eastern Counties Railway (ECR). As March quickly became a four-way junction, with lines heading in a north-westerly and north-easterly direction, as well as the Ely and Peterborough Branch which lead east and west, traffic developed and a small engine shed was provided in 1850 in the fork of the Peterborough and Wisbech lines at the end of the two-platform station. The Eastern Counties Railway was locked into an area of industrial insignificance with little mineral traffic, which was the backbone of railway prosperity. East Anglia was largely an agricultural region and the resultant goods traffic was sparse and fluctuated with the seasons. By 1862, the ECR had absorbed most of the other railways in East Anglia and adopted the name the 'Great Eastern Railway' (GER). The GER wanted to improve its finances by providing a line north, initially from March to Spalding via Thorney and Crowland, but this was rejected in Parliament in favour of an alternative route promoted by the GER's rival, the Great Northern Railway (GNR). This line, via Murrow and Guyhirn was opened in 1867, and it was from this point that sidings were laid out on Norwood Common, to the north of the town, and would later be known as Whitemoor (Stacey 1997, 61). A degree of reconciliation between the two companies led to the creation of the Great Northern and Great Eastern Joint Committee (1879), which in 1882 opened its Spalding-Sleaford-Lincoln line, which gave the GER access to the coalfields of Nottinghamshire, Derbyshire and South Yorkshire, which consequently gave March its nodal status in sorting loaded coal wagons coming south and empties returning north. This was very important: most wagons were 'private owner' (i.e. they belonged to the originating colliery company or the eventual recipient, coal merchants, gas companies etc) and therefore the wagons had to arrive at/return to the appropriate destination (Tony Kirby pers. comm.).

At the end of the 19th century March had become a prominent railway town, and during the 1880s a large increase in the town's population occurred to provide a workforce for the ever-expanding railway (Stacey 1997, 62). A report in July 1883 noted: '*March is becoming one of the company's most important junctions, 75 passenger trains, exclusive of specials, pass through there every day*' (Ludlam 2009). It would appear from further information provided in this 1883 report that March Station was clearly not equipped to cope with the demands of the increased traffic. Plans were submitted for a new engine shed for the now amalgamated 'Great Northern and Great Eastern Joint Railway', with six 'roads' covered by three roof pitches, turntables, coaling facilities and water tank at the Whitemoor Yards, which extended for around a mile to the north as far as Grassmoor Junction (*ibid*). The extent of the sidings at Whitemoor in the late 19th century can be seen on the First Edition Ordnance Survey map of 1886 (Figure 3).

In the 1920s, when the Great Eastern and the Great Northern Railway companies had been absorbed into the London and North Eastern Railway (LNER), the facilities at March and Whitemoor were described as totally inadequate and out-of-date. Freight operations at March had always been more significant than passenger traffic, and the LNER recognised that March was at the focal point of lines from London and East Anglia to the north and Midlands (Waszak 1985). As a consequence, the LNER embarked on a £285,000 scheme to construct a fully-mechanised, gravity-worked 'up yard', in response to the new sugar beet traffic and the substantial existing freight, especially of coal. This new work was completed in 1929 and the 'down yard' was similarly reconstructed in 1931 (Gordon 1968, 218).

Whitemoor was consequently the site of Britain's first 'mechanised hump' marshalling yard, a system which used gravity to allow wagons to enter the sidings where they were sorted automatically into sets for onward transfer to their destination. The site had two humps, northbound and southbound, which fed wagons into the two yards (the Up yard and Down yard). The site was also the first to employ the Frölich retarders which used compressed air brakes to control the speed of the wagons as they descended from the hump. Two position signals were used by the shunting staff at Whitemoor Hump to indicate to the shunt engine driver the required speed to propel the wagons over the hump. As such, Whitemoor Marshalling Yard was the site of technical innovation. Once the Up and Down yards were operational in 1933, it was believed to have been the largest marshalling yard in Europe (Jacobs 2008).

Marshalling yards are sidings where trains were made up or 'marshalled' by shunting wagons around. Larger yards have arrival, shunting and departing sidings. 'Flat' yards are worked entirely by shunting engines, in comparison, 'hump' yards are where shunting can be carried out by gravity, by constructing a raising gradient and slowing individual wagons to roll down from the top into the required siding (Morriss 2003, 166 and 168).

Unlike railway freight depots, marshalling yards were, to a large extent, a 20th century creation. There were large groups of sidings in the 19th century, connected mainly with coal traffic, but it is generally accepted that the gently inclined sidings at Edge Hill, Liverpool, which were laid out by the London and North Western Railway (LNWR) in *c.* 1900 represented an innovation. The Midland Railway constructed a 'hump' yard at Toton, Nottinghamshire, where wag-

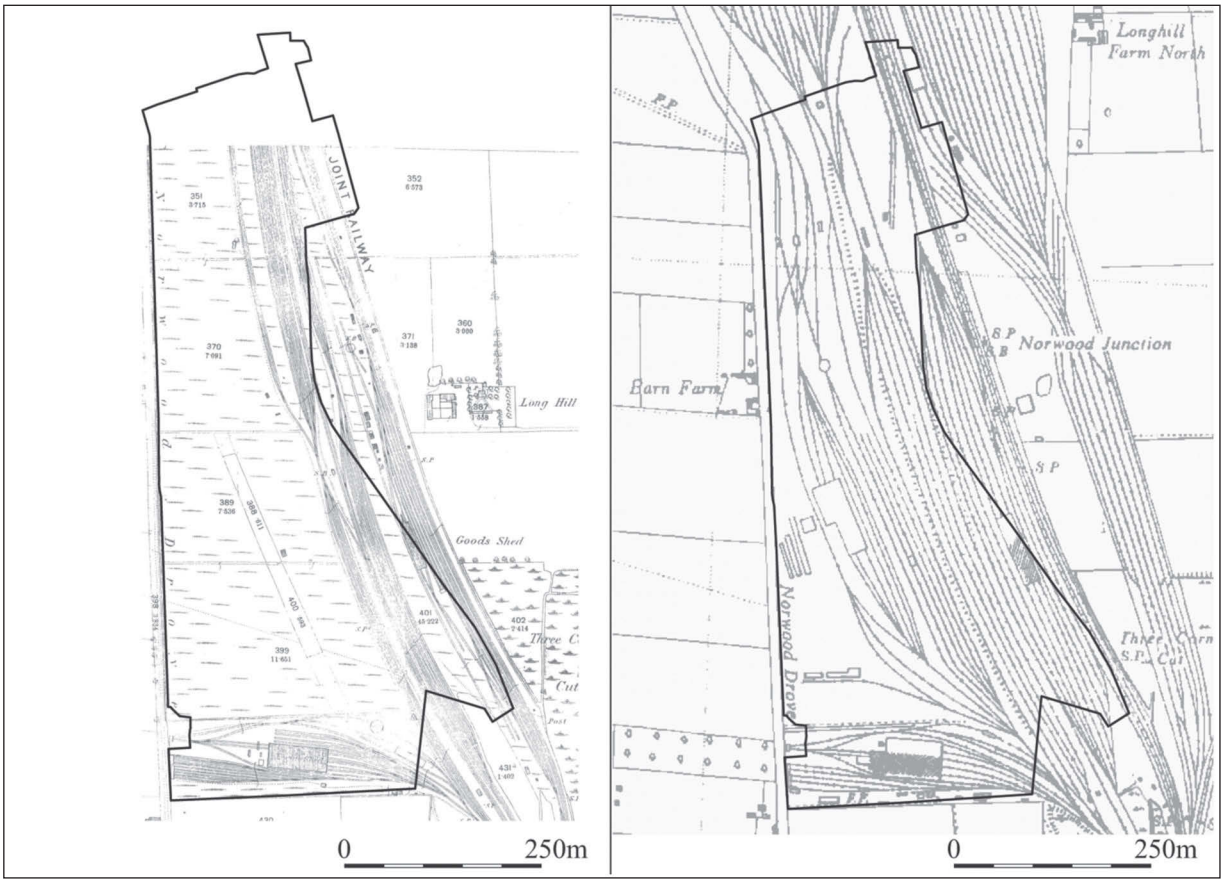


Figure 3. *Historic maps, 1886 and 1950.*

ons were pushed over the summit of the hump and their own momentum and a steeper gradient would take them down into a fan of reception sidings. In 1907 Great Central Railway opened a hump yard at Wath, south Yorkshire, in which wagons were slowed down by mechanical retarders. Further complex yards were constructed by companies such as the North Eastern Railway at sites such as Newport, Teesside, and during the inter-war years, extensive yards were built at Feltham, Middlesex (LSWR 1921–23); Mottram near Manchester (1935); Hull (LNER 1935); Banbury by the GWR (1931), and of course Whitemoor (1929 and 1933) (Stratton and Trinder 2000, 167). An article in The Railway Gazette of September 20th 1929 declared of Whitemoor Marshalling Yard: '*This new hump yard, near March, is the first in Great Britain equipped with Frölich Retarders. Accommodation is provided for 4000 wagons, serving 350 destinations. At this yard the whole of the coal and goods traffic for the Eastern Section of the LNER from places north, east and west of Doncaster, and also from collieries and yards on the Great Central Section, Nottinghamshire and Derbyshire lines via Lincoln, is received and marshaled for forward transit*' (Great Eastern Railway Society Sheet M298). Figure 4 provides a general view of the Whitemoor 'Up' Yard looking south; with the loaded wagons passing from the Hump to the sorting sidings, and Figure 5 is a view of wagons on the gravity hump itself.

Most marshalling yards were extended during the Second World War, and Whitemoor was no exception. The site became one of the most important in the country, with the volume of traffic growing to immense proportions as large quantities of war material passed through and despite staff shortages, poor quality coal, deteriorating locomotives and stock, and the blackout, the site endured (Ludlam 2009, 391). It is interesting to note that during the Second World War, there would have been anything up to 150 engines allocated to March; as a result the site became a potential target for German bombing. In an attempt to prevent such action, a site known as a 'Starfish' decoy was established at Stags Holt to the south of the town. Starfish (or 'Special Fires' or 'SF') sites were the codenames for decoys where a variety of effects to represent small or major conflagrations were staged in order to divert bombers away from intended targets (Brown *et al.* 1996, 64). The yards at Whitemoor escaped relatively lightly during the war, with the most serious incident involving a low-flying Wellington bomber which clipped the 'up hump' and crashed (Ludlam 2009, 391). Figure 6 shows technical drawings for a proposed new turntable at Whitemoor Yard, dated to 1944; this turntable would be fully excavated during the archaeological work (Turntable 2). By the late 1960s, wagonload freight traffic began to decline, in particular the once extensive household

Figure 4. *General view of Whitemoor Marshalling Yard* c. *1929, looking south, with wagons passing from the hump through the retarders to the sorting sidings. Image courtesy of Railway Gazette 1929.*

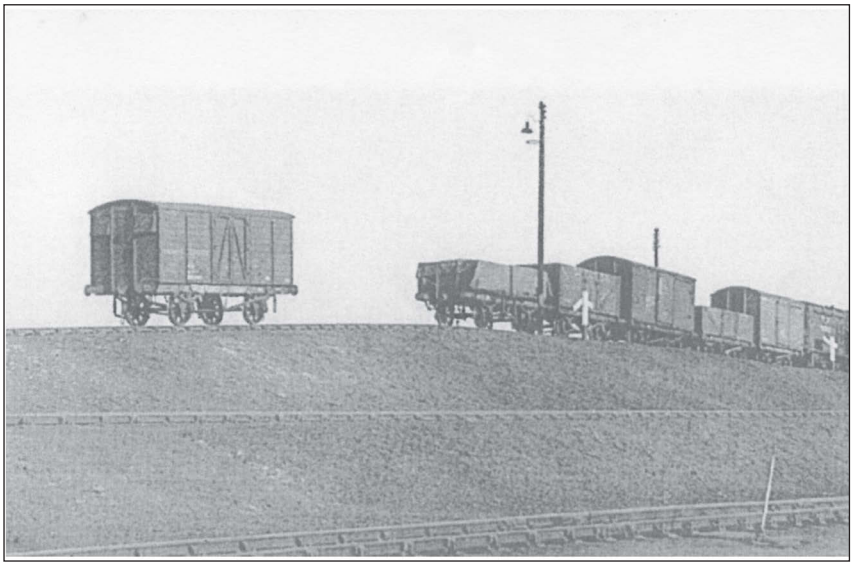


Figure 5. *Wagons on the Gravity Hump at Whitemoor Marshalling Yard* c. *1929. Image courtesy of Railway Gazette 1929.*

coal traffic. Whitemoor remained busy at times, particularly when the late autumn seasonal transfer of beet pulp and seed potato traffic coincided with the pre-Christmas coal and parcels peak. By January 1972, freight traffic had declined to the extent that British Rail closed the Down yard at Whitemoor, marshalling being concentrated at the Up and Norwood Yards.

Following the decline of the railways as a result of post-war transfer of freight to road transport, the traffic through the Whitemoor Marshalling Yard began to reduce and despite some improvements in the 1980s, it closed in the early 1990s when many of the railway structures were demolished (Jacobs 2008). Although the excavations revealed archaeology from a number of earlier periods, including indications of the Romano-British landscape (Figure 7), this paper focuses on the modern industrial archaeology of the railway itself.

Archaeological Excavations:

Whitemoor Marshalling Yard

Several of the evaluation trenches were located to target features of interest relating to one of the railway marshalling yards (the Down yard), whilst the open area excavations concentrated on certain aspects of the marshalling yard, including the total excavation of two 20th century turntables and a section of the 20th century Gravity Hump.

Inspection Pits

Trenches 24 and 25 were targeted to investigate the remains of railway inspection pits which had been identified by the previous topographic survey (Railton 2010) (Figure 2). Trench 24 was aligned from southwest to northeast, at right angles to the presumed alignment of the inspection pits. A total of nine pits were revealed in this trench, and Trench 25

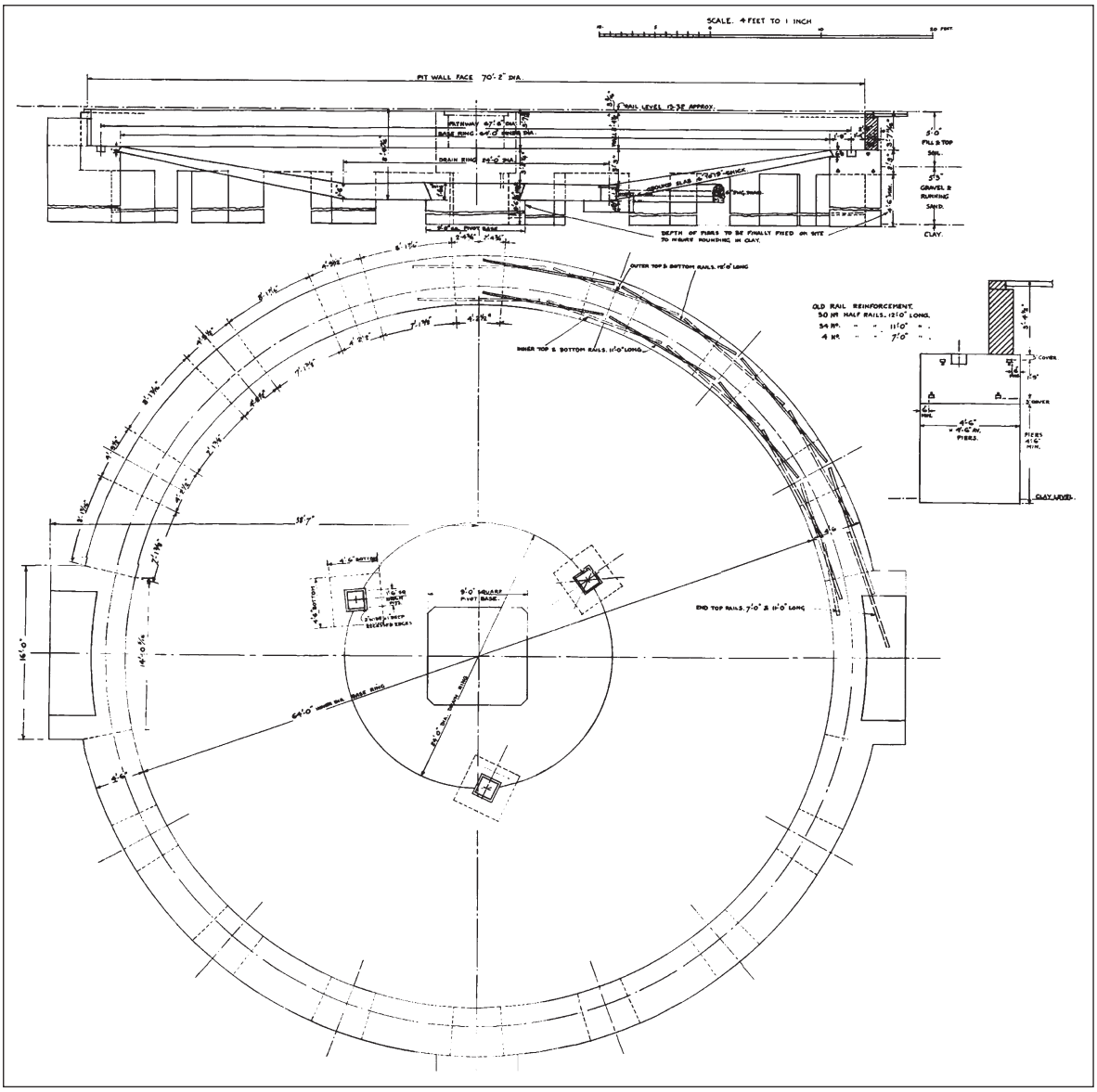


Figure 6. *Plan of the new turntable, 1944. (Courtesy of Network Rail).*

was set at a right angle to Trench 24 in order to expose the full length of one example.

It was clear that the inspection pits were identical in construction method and materials, each set in a vertical-sided, flat-bottomed foundation cut, with concrete rafts forming the bedding layers for the walls. Brick floors were laid between the side walls, so that the inspection pits were entirely brick-lined. One of the inspection pits was fully exposed and excavated in Trench 25. This pit had an overall length of 17.25m and width of 2.20m, with an internal width of 1.14m. The side walls were constructed of machine-moulded, dark red-black bricks, laid in a bond that alternated two courses of stretchers (the long edge of the brick) with one course of headers (the short end of the brick). The walls were 0.58m wide and were constructed to a height of 0.76m above the floor level of the pit. The upper courses of bricks facing the interior of the pit were bull-nosed, whilst those facing outwards were flat faced. A series of evenly-spaced rectangular impressions ran along the entire length of the side walls; these impressions incorporated the remains of iron fixing bolts, and from several *in situ* examples observed in Trench 24 it was clear that the impressions represented the fixing points for track shoes which had supported the rails running along the length of the walls.

The floor of the pit was constructed of bricks identical to those used for the walls. The floor level had a gradual fall from northwest to southeast, whilst the brickwork itself had been laid with a concave camber. At the southeastern end of the pit, the floor drained into a northeast to southwest aligned drain that probably also served the other inspection pits in this area. The drain was covered by an iron inspection hatch that also formed the lowest of three access steps into

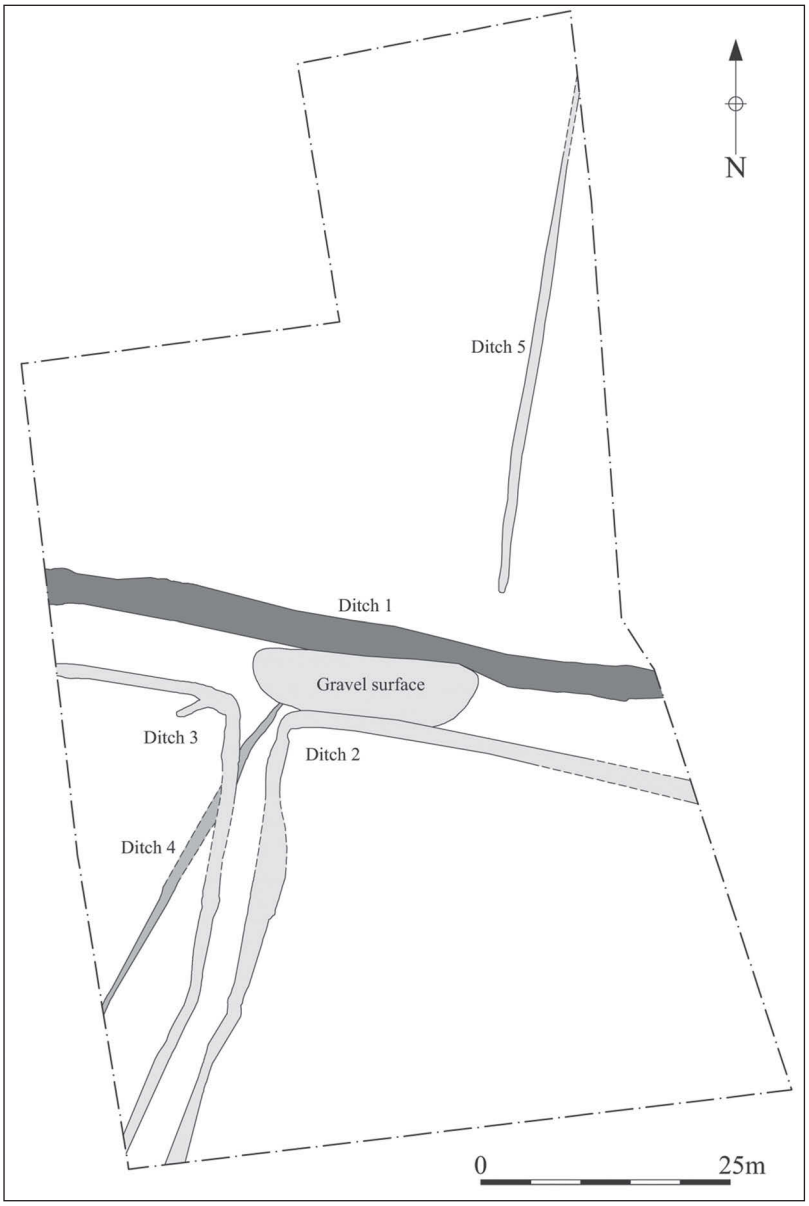


Figure 7. *Excavation Area 2 features.*

Figure 8. *Inspection pit in Trench 25, looking south-east.*

the pit, the remaining two being brick-built and incorporated into the south-eastern wall. A similar flight of steps formed the north-western wall of the pit (Figures 8 and 9).

The inspection pits revealed in Trenches 24 and 25 do not appear on an Ordnance Survey map of 1925, and no railway tracks are represented in this area of the site at that date. They may therefore have formed part of the redevelopment of the marshalling yard in the 1930s. A further eight inspection pits were revealed to the north, in Trench 29, which was targeted over the area of a former large 'main running shed'. The construction of these inspection pits was very similar to those observed in Trenches 24 and 25. Brick floors were revealed between five of these inspection pits, all of which would have been located within the large shed. The floors were laid at the surface level of the pits and represented the original floor level within the building. All the floors were constructed of bricks similar to those used in the construction of the inspection pits.

Turntables

Two large turntables associated with the marshalling yard were fully excavated, one located to the south-west side of the site (Turntable 1) and the other (Turntable 2) located further to the north (Figure 2). In a railway context, turntables were used to 'turn around rolling stock'. They were especially used for locomotives, although in the early days of railways they were also used for wagons and coaches (Morriss 2003, 173). The earliest phase of Whitemoor Marshalling Yard had at least one turntable, shown as a circular feature on the First Edition Ordnance

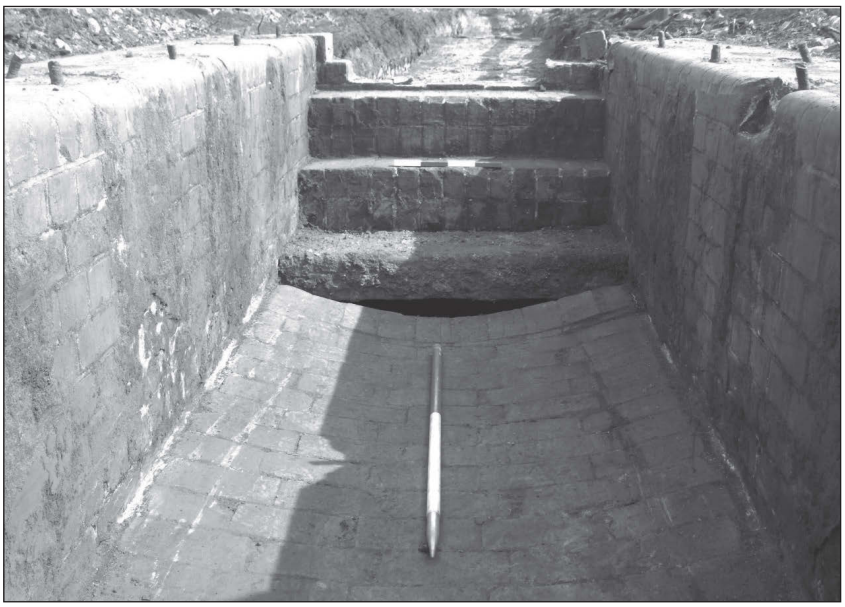


Figure 9. *The concave base of the inspection pit in Trench 25.*

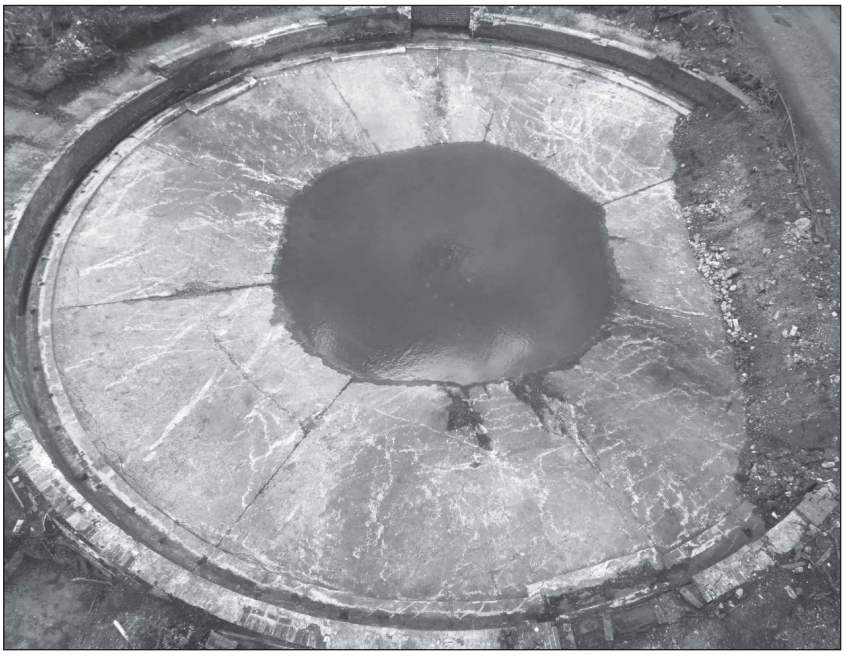
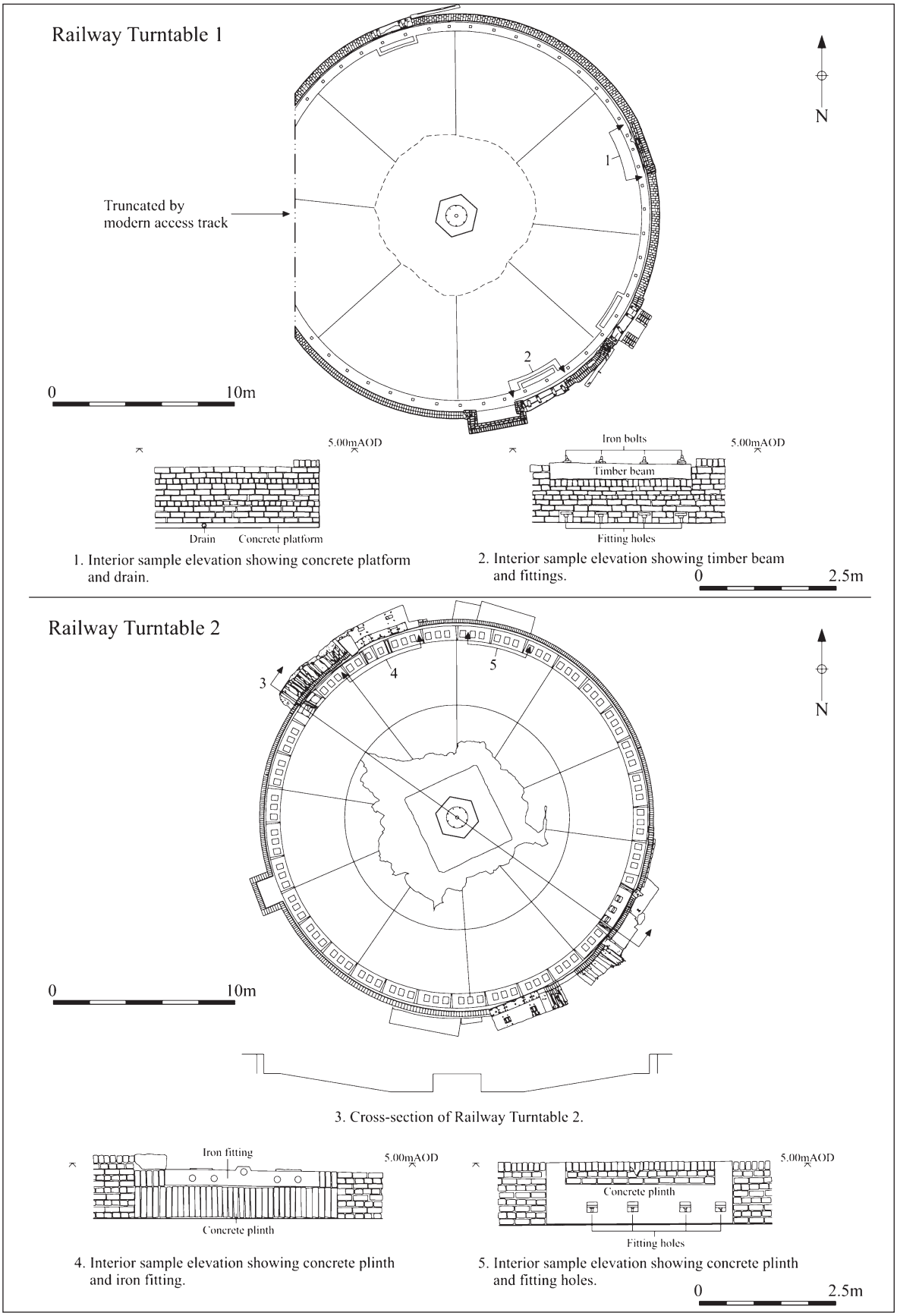


Figure 10. *Aerial view of Turntable 1, looking south.*



1. Interior sample elevation showing concrete platform and drain.

2. Interior sample elevation showing timber beam and fittings.

3. Cross-section of Railway Turntable 2.

4. Interior sample elevation showing concrete plinth and iron fitting.

5. Interior sample elevation showing concrete plinth and fitting holes.

Figure 11. *Railway turntables plans, cross-section and sample elevations.*

Survey map of 1886 (Figure 3). However, the two excavated examples were both 20th century in date.

The Turntable 1 structure survived substantially intact, set within a 23m diameter circular construction cut. The turntable consisted of a 20.70m diameter concrete floor with a conical profile, which sloped steeply towards the centre. The floor had been laid in sections with the joints between each segment clearly visible (Figure 10). The enclosure wall of Turntable 1 was constructed of machine-moulded brick which was 11 courses in height, and was laid in stretcher bond. The wall had been constructed on a concrete platform which ran around the circumference of the floor of the turntable.

The centre of the floor almost certainly originally contained a substantial concrete stanchion supporting the central pivot or bearing for the rotating turntable arm, however this could not be identified as the centre of the turntable could not be completely drained of water. It would seem likely that the central pivot was destroyed or removed during the salvage of the turntable arm for scrap and that this process had also destroyed a sub-floor drain in the centre leading to the flooding.

Whilst the turntable arm and central pivot were missing, a number of interesting constructional details were observed. A 0.10m wide, 0.05m deep open drain ran around the circumference of the concrete platform on which the brick wall was constructed, close to the inner face of this wall (Figure 11). Set within the concrete platform which ran around the inner edge of the turntable were a series of rectangular machine-cut timber uprights, arranged in a radial pattern, which had been sawn off at the level of the concrete surface. The timbers originally supported a radial track or rail that ran around the inner circumference of the wall, which supported the ends of the turntable arm as it rotated.

At three points around the circumference of the wall of Turntable 1, the upper course of brick was interrupted by the insertion of 0.50m wide, 2.50m long timber beams, each of which still contained the remains of metal fixings. Situated immediately below each of these beams were a series of four rectangular openings in the inner face of the turntable wall (Figure 12). Iron fittings could be observed within these holes and it is likely that these represented the other ends of the fixings visible in the upper surfaces of the timbers. Rectangular concrete pads were incorporated into the platform surface immediately in front of these openings, and each of these also contained the remains of iron fixing bolts. To the exterior of the turntable, three 1m wide, 0.20m long concrete and brick-built plinths were located immediately behind the timbers set within the turntable wall (Figure 11). It was therefore clear that the timbers and associated plinths represented the three points at which tracks entered the turntable, whilst the concrete and iron fixings in the interior of the structure probably represented the remains of the locking mechanism by which the turntable arm was correctly aligned with the tracks.

A final interesting feature of Turntable 1 was the discovery of a graffito which had been scratched into the surface of the concrete when it was still wet. This graffito referred to *September 1932* and may therefore provide a date of construction for Turntable 1.

Following the removal of the turntable arm and its associated machinery, Turntable 1 had been deliberately backfilled with a mixture of modern broken brick and railway clinker. This deposit was remarkably homogenous and the bricks appeared to have come from a nearby structure that may have been demolished at around the same time.

Turntable 2 was situated in the northern part of the site (Figure 2). A construction blueprint dated 1944 exists for this structure (Figure 6), which appears to have superceded Turntable 1.

Turntable 2 consisted of a large circular construction cut that truncated the natural sandy clays, and the overlying silty clay subsoil. Set within this cut was a conical concrete floor, with an internal diameter of 21.34m (slightly larger than Turntable 1), which dipped slightly towards the centre of the structure

Figure 12. *Turntable 1 detail, showing timber beam, openings and concrete platform.*

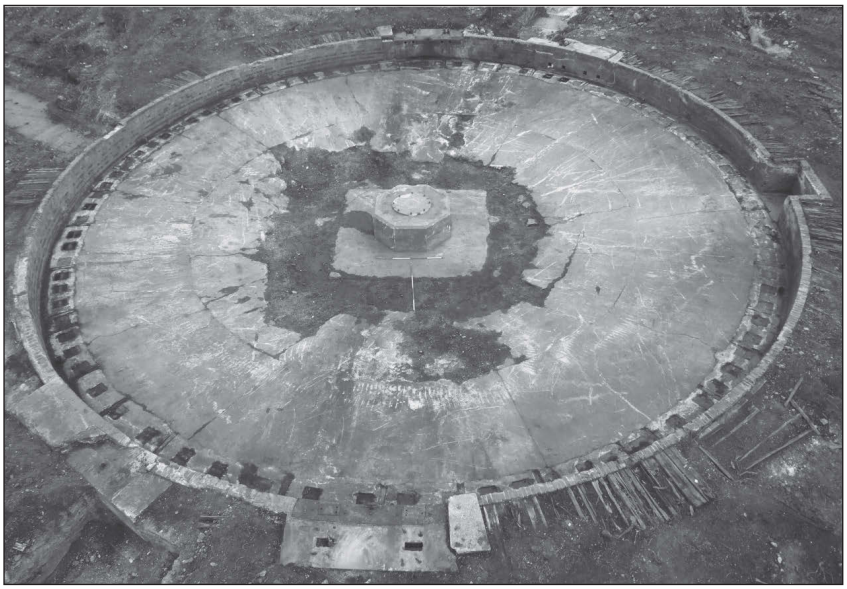


Figure 13. *Aerial view of Turntable 2, looking south-east.*

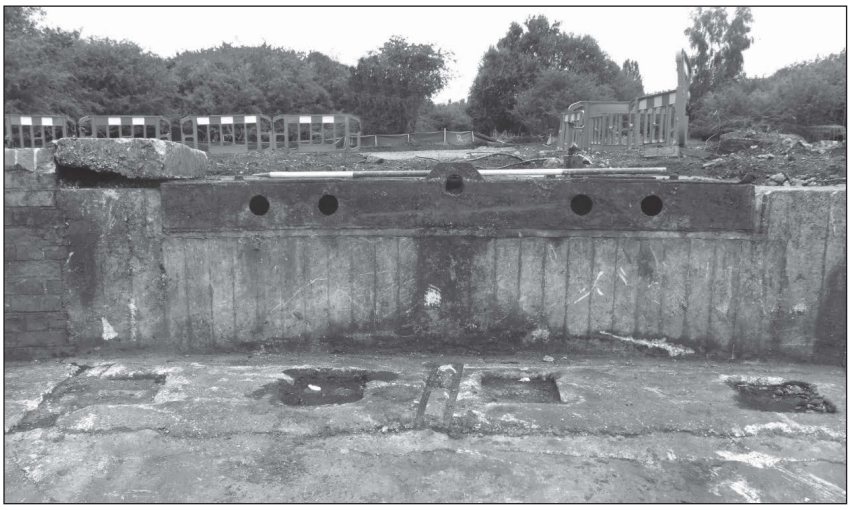


Figure 14. *Detail of wall of Turntable 2, showing imprint of shuttering.*

(Figure 13). The floor acted as a foundation for the circular turntable wall, which was constructed of brick. This enclosing brick wall survived to its full height of nine courses (1.10m) and was constructed of frogged, machine-moulded red bricks laid in alternate header and stretcher bond, capped with a top course of edge-laid headers. It was noted that some of the bricks were stamped 'ACCRINGTON NORI', these were hard, smooth, deep-red pressed bricks made of shale from the Coal Measures near Accrington, East Lancashire. They were widely used for engineering and industrial purposes and also for other building types in the late 19th and early 20th centuries. One of the trade names, 'Nori', is 'iron' spelt backwards and indicates the character of the brick (Brunskill 1990, 86). It was noticeable that the wall of Turntable 2 was markedly less substantial than that of Turntable 1, which may have reflected the shortage of suitable building materials in the immediate post-war period.

Whilst the construction of Turntables 1 and 2 were broadly similar, the two structures differed in some respects. Firstly the floor, which was also constructed in sections, appeared to be less well-preserved than the floor of Turntable 1, the centre section giving the appearance of having subsided slightly, possibly reflecting the use of an insufficient, or poorer quality, concrete. At the centre of the floor, the concrete support for the turntable pivot bearing remained *in situ*. This support was a massive octagonal structure with a diameter of 2.50m and a height of 1.20m. Its upper surface bore the impression of a 1.15m diameter circular mounting and a series of fixing bolts, but the pivot bearing itself had been removed.

Set within the internal sides of Turntable 2 were two areas which consisted of 2.70m long concrete structures that each incorporated four small rectangular holes, similar to those observed in the wall of Turntable 1, although no horizontal timbers survived (if they existed) in these features. As with Turntable 1, iron fittings could be observed within these holes. There were indications that the upper layer of concrete on the structures themselves and the upper courses of wall above them had both been laid as part of a later phase of remodelling, and from this it was inferred

that these two features represented the original position of tracks entering the turntable that were subsequently replaced by two similar entry/exit points.

The internal sides of Turntable 2 contained two sections where the imprints of vertical timber plank shuttering for poured concrete could be observed between the brickwork (Figure 14). These sections related to the locations where the track entered the turntable, possibly after the remodelling, and each was constructed of a 3.30m long, 1.20m wide concrete plinth into which was set a rectangular iron fitting. These iron fittings were visible in the elevations of the turntable wall, and each incorporated four circular holes together with a centrally-placed raised fixing loop that faced the interior of the turntable.

The upper side of the iron box-like fittings had cast diamond-pattern non-slip surfaces and incorporated two smaller plates with track fixing bolts. Immediately behind the plates, and in line with them, the concrete plinths incorporated rectangular holes that housed short upright iron girders that were flanked by track fixing bolts, believed to be the track entry points to Turntable 2.

Running around the circumference of the floor of Turntable 2, close to the inner face of the wall, were a series of regularly-spaced roughly-applied square, shallow concrete recesses, each of which incorporated the remains of four fixing bolts and the impression of a metal track shoe (Figure 14). A number of re-used iron rails were embedded vertically in the floor and, together with the concrete and iron track fixings, these appeared to be the remains of supports for a circular rail that originally ran around the inner circumference of the turntable, supporting the rotating turntable arm.

The final feature of interest with regards to Turntable 2 was a timber walkway which ran around the exterior of the structure. The walkway was 1.0m wide and consisted of radially-laid planks which were formed from cut-down railway sleepers. The walkway was fastened together by long hand-wrought nails.

A former worker at the marshalling yard, who attended the open day held following the excavations, indicated that, as originally constructed, Turntable 2 was not motorised, but was turned by hand, the careful balancing of the turntable allowing a locomotive to be turned with relatively little effort. The walkway, therefore, formed the track around which the operatives turning the arm would walk.

As with Turntable 1, all of the machinery associated with Turntable 2 had evidently been salvaged when the structure fell into disuse. The interior had then been backfilled with a mixture of demolition rubble, broken concrete and ashy silt.

Recent archaeological work undertaken by Pre-Construct Archaeology Ltd (PCA) has revealed evidence for 19th century turntables within roundhouses at York. And at the former Great Northern Goods Yard at King's Cross in London, PCA have recorded a number of 19th century turntables within and outside a Granary Complex Goods Shed, however two 20th century turntables, which may have been comparable with those at Whitemoor Marshalling Yard, had been removed prior to the archaeological work taking place. A mid-20th century turntable of 70ft diameter was recorded by PCA at the former Old Oak Common locomotive depot in 2010; this example had been constructed by Cowan Sheldon and Co of Carlisle in 1953 and was electronically driven (pers. comm. G Thompson, Pre Construct Archaeology (PCA)).

Gravity Hump

A 20m by 20m area at the extreme northern end of the Gravity Hump was excavated as part of the agreed mitigation strategy (Figure 2). The excavation revealed the remains of a brick and concrete structure measuring 6.5m by 3.0m. The structure appeared to have been built in two phases and consisted of a southern concrete foundation raft that supported a rectangular grey brick structure that contained a drain or manhole (Figure 15). A rectangular concrete beam, which possibly protected a buried drain or pipe, extended from the eastern side of the foundation.

The northern part of the structure consisted of an open-ended rectangular enclosure that was made of red, moulded bricks. Four large iron bolts were set into the brickwork, suggesting that the structure probably acted as a machinery base. No machinery remained *in situ* and the purpose of the structure has therefore remained unclear. Its location, however, on the gravity hump suggests that it was part of the railway control and switching apparatus.

Finds

Most of the modern finds recovered during the archaeological work at Whitemoor Marshalling Yard were found during topsoil stripping or were surface finds that were collected as they were encountered. The remainder were found within the backfill of railway features, most notably the two turntables and inspection pits. As far as could be ascertained, all of the material dated to the 20th century when the railway yards reached their height of operation. Some of the material, most notably the marked pottery, pre-dated the nationalisation of the railways in 1947, whilst the diagnostic British Railways items clearly post-dated this. The majority of the material represented discarded rubbish that had accumulated across the site and was therefore of little use in dating and phasing the railway structures.

There were several items found during the archaeological work which are of interest, and in some cases, Mr Barry Howlett, a former worker at the marshalling yard who attended an open-day at the site, was able to identify many of the more esoteric finds.

Figure 16 shows a large inflatable rubber dunnage manufactured by RFD Company Ltd, which would have been used for protecting fragile cargo. Of particular interest amongst the metalwork assemblage were several corkscrew-shaped iron hooks that were evidently designed to fit a long wooden handle. These were identified by Mr Howlett as shunters' poles, the hooks being used to snag wagon couplings as a means of directing and controlling the wagons as

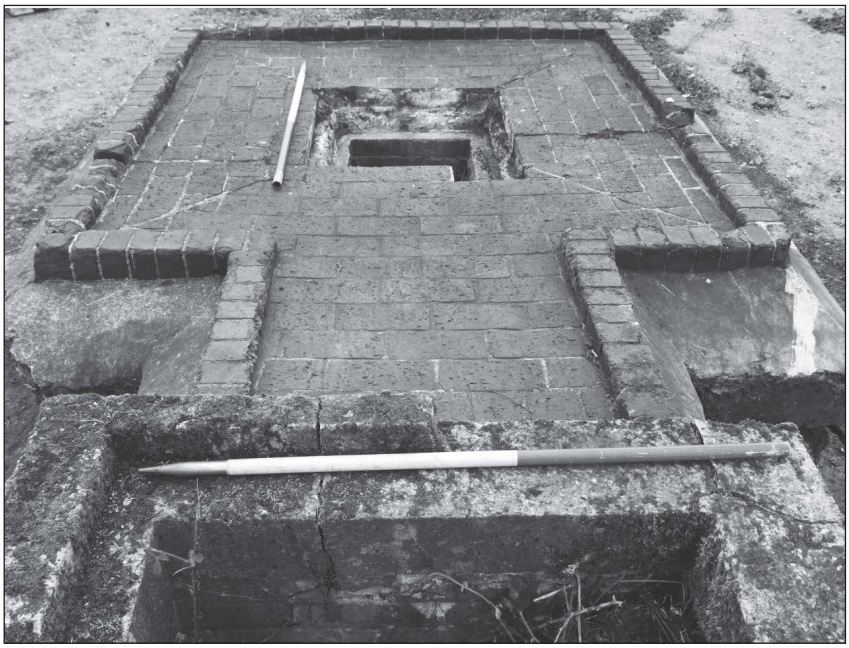


Figure 15. *View of the Gravity Hump structure, looking south.*

Figure 16. *An inflatable rubber dunnage.*

they were dispensed to various sidings via the gravity hump. Other tools included firemans' shovels, a British Rail watering can, a 2m long heavy iron pinch bar, of a type used to help move wagons by hand, and an outsized spanner.

Air Raid Shelters

It has already been noted that Whitemoor Marshalling Yard was partly protected by a decoy site located at Stag Holt to the south of March during the Second World War. Other 20th century defence structures were identified within the proposed development area, which were subsequently recorded in 2009 and 2010 (Lilley and Lowman 2009; Railton 2010). These structures consisted of six air raid shelters which were located around the site, and presumably would have provided protection for the workers at the marshalling yard (Figure 2).

Air Raid Shelter No. 1 was completely uncovered in 2009 to enable a condition survey to be undertaken, prior to being recovered. It measured 20m in length, 13m wide and 3m high. This semi-circular structure comprised a brick-built entrance, with earth and concrete floor, bitumen covered concrete roof slab and pre-cast concrete arched beams with brick end walls and a large ventilation pipe to the rear (Figure 17). Concrete foundations were observed surrounding the outer walls of the structure. The building had been completely covered by medium brown sandy soil of around 0.4m in thickness, with soils sealing the front and rear access consisting of ballast, brick waste, metal and concrete (Railton 2010; Lilley and Lowman 2009).

Air Raid Shelter No's. 2, 3, 4 and 6 were all of a similar earth-covered design, however at the extreme north end of the survey area was Air Raid

Figure 17. *Air Raid Shelter No. 1, after the removal of its earth covering.*

Shelter No. 5 which was different to the other five recorded on the site. This example consisted of an earth-covered mound approximately 16m in length, 10m wide and standing 2m high, at the north end of a 70m-long earth ridge. The entrance to this shelter was exposed, and comprised a 1.8m-high, 0.90-wide square entrance with a concrete lintel, leading to an L-shaped entrance passage. This shelter was the only one noted during the survey where an escape hatch was observed, constructed from brick with an iron door, although a thorough assessment was not possible due to ground cover and lack of access to the interiors.

The Romano-British Landscape

The initial archaeological evaluation, which consisted of the excavation of 65 trenches across the site, was undertaken in order to establish the nature and extent of archaeological remains within the vicinity, the trenches being located to target specific remains of the marshalling yard infrastructure and less obviously disturbed parts of the site where there was the increased likelihood of the survival of earlier subsurface archaeological features (Cavanagh 2011).

The archaeological work revealed several Romano-British features consisting of a series of pits in the central part of the site (Area 1), and possible linear features on the north side of the site, as well as substantial boundary features and track ways in the southern part of the site (Area 2) (Figure 2).

The pits in Area 1 were all sealed by modern clinker topsoil, there being no original subsoil coverage. It is therefore likely that they had suffered some degree of vertical truncation during the establishment of the railway yard, this fact accounting for the relatively shallow depth of the features. All the fills were relatively similar in composition, with little obvious organic content. Whilst a sequence of excavation could be discerned within each group, the similarity of the fills and the morphology of the features suggest that they represented a single phase of archaeological activity, perhaps relating to the quarrying of gravel. Limited pottery finds from several features would suggest that this activity was Romano-British (1st to 2nd century) in date. A single linear feature in Trench 51 (on the north side of the site) also contained possible Iron Age hand-made pottery, suggesting the presence of an earlier phase of activity at the site.

The Area 2 excavation revealed a series of five ditches that are believed to relate to further Romano-British activity and demonstrate the development of the early landscape (Figure 7). The most substantial ditch (Ditch 1) was between 3.4m and 3.9m wide and 0.7m to 1.0m deep, with a concave profile, aligned northwest to southeast. This contained ceramic material dating from the 1st–2nd century and to the 4th century, suggesting a long period of use. The size of the ditch indicated that this was a substantial boundary feature.

To the south of this feature two parallel northeast to southwest aligned ditches appeared to define a *c.* 3.3m-wide trackway. Ditch 2 turned eastwards at its northern end running parallel with Ditch 1, while Ditch 3 turned westwards at its northern end, thus forming another 6m-wide trackway when combined with Ditch 1 (Figure 7). Sections were excavated at key points along these ditches, showing these were continuous. The northwest to southeast sections of these ditches were 1.1m to 1.4m wide and 0.5m to 0.6m deep, with a rounded profile. The northeast to southwest trackway ditches were somewhat similar in size and depth, but with a V-shaped profile. These ditches contained 1st to 2nd century Roman pottery including ten sherds of heavily abraded Samian ware (Webster 1996, 47; Dresser (DR).37 form). Ditch 3 cut (and therefore post-dated) another undated linear feature (Ditch 4). To the north of these was a further ditch (Ditch 5) which had a similar alignment, and probably formed the continuation of a Romano-British field system.

The pottery evidence was insufficient to precisely date the sequence of ditches. However, the principal ditch (Ditch 1) is the largest of the east-west features and runs unbroken across the site. This northerly ditch could be identified as far east as Trench 18, whilst no trace of the southern ditch (Ditch 2) was identified to

the east of Area 2. This would suggest that Ditch 1 was the earliest feature in this area, with the southern ditches (Ditch 2 and Ditch 3) being added at a later date to form a T-junction. These ditches (along with Ditch 4) are indicative of a field system, which was established around an existing boundary ditch (Ditch 1), also providing access tracks between the fields.

Interestingly, the northeast to southwest trackway corresponded to the alignment of the Fen Causeway Roman Road, and broadly followed the more southerly of the two routes projected from crop marks to the west of the site. However, there was very little evidence for a surface between these parallel ditches, apart from a 0.22m-deep gravel and silt deposit which was observed in section in Trench 12, and is believed to be associated. The deposit had a marked camber and was situated at a maximum height of 4.46m AOD, directly overlying the natural subsoil. Following the stripping of Area 2, further patches of gravel surfacing were noted. Test pits cut into the surface showed it to be 0.12m deep and with the top of the gravel at a mean level of 4.40m AOD. This deposit was sealed by a sequence of shallow sandy clay, clay silt and silty clay deposits. The latest fill appeared to be relatively modern, with a high organic content and, together with the underlying sequence of fills, was indicative of a prolonged period of natural post-abandonment silting.

The initial interpretation was that this trackway was indeed a section of the Fen Causeway Roman road, which was established in the 1st or early 2nd century AD (Fincham 1998, 26). However, reassessment of the Romano-British features excavated has led to the conclusion that the excavated remains are unlikely to represent the Fen Causeway Roman road as originally suggested. Instead they appear to be an agglomeration of later features, relating to the development of a Romano-British field system. The northern ditch in particular was more substantial than those usually associated with Roman roads. However, it is certainly possible that these boundary features respected (and therefore may have post-dated) the alignment of the Fen Causeway Roman road.

Archaeological evidence for the Fen Causeway Roman Road has been recorded to the rear of 92 Elm Road, March, located to the east of the Whitemoor Marshalling Yard site. Here, an archaeological evaluation in 2005 located the Causeway on the northern side of the site, close to the junction of Elm Road and Dagless Way in Trench 4. The road was characterised by a layer of gravel, 0.10m thick, lying over the thin alluvial soil which is found in this area. A roadside ditch measuring 1.58m in width and 0.74m deep with a flat base was excavated on the south side of the Causeway. A single sherd of Samian pottery of late 2nd to mid-3rd century date was recovered from this ditch. No ditch was found on the north side of the road, although it was noted that this was likely to have existed outside the area under investigation. The southern ditch was thought to have been truncated, probably during ground reduction for the construction of the property (Weston and Williams 2005).

The excavation at Whitemoor Sidings has provided an insight into how the Fenland was organised in the Romano-British period, although the exact location of the Fen Causeway Roman Road remains uncertain. Based on the nature of the excavated ditches, the recorded trackways may have only constituted access routes between fields or enclosures.

Conclusion

The archaeological work at Whitemoor Marshalling Yard has revealed evidence for an early phase of activity at the site dated to the Romano-British period. This includes a series of pits and linear features to the north of the site, some of which may be Iron Age in date, and a series of ditches to the south which appear to define a series routeways, and part of an extensive Romano-British field system.

The Romano-British activity observed within the site boundary should be viewed in the context of the wider landscape. Romano-British ditches have been recorded to the east of the current site (Hall 2004), to the south-west at Norwood Road (Cooper 2007) and to the west of Hundred Road (Hutton and Standring 2008). At the latter site, additional features in the form of pits and a watering hole that had probably been re-dug on a number of occasions were similar to features observed at the Whitemoor Marshalling Yard site. Evidence of Romano-British settlement has been forthcoming from sites such as Wimblington Road (Cooper 2003) to the south and Longhill Road, March to the north-east (Atkins 203). Both of these sites, which lie respectively on the southern and north-eastern limits of March island, have also provided evidence of Romano-British salt production. A clear picture is thus emerging of a Romano-British agrarian landscape, in which rectangular field systems bounded by drainage ditches flanked the route of the Fen Causeway Roman road and its subsidiary tracks.

Modern features of archaeological interest were also recorded comprising the remains of the infrastructure of a former railway marshalling yard. Evidence for track beds were noted in several locations, and it is likely that these related to the earliest phases of development on the site in the second half of the 19th century. There remains, however, consisted only of the ash-filled impressions of uprooted railway sleepers, together with deposits of chalk bedding material. Indeed, it is notable that no *in situ* rails or sleepers were encountered in any part of the site.

With the exception of the early track beds, the excavated and recorded railway features dated to the extensive development of the Down yard at Whitemoor Marshalling Yard in the first half of the 20th century. Of particular interest were the two backfilled turntables and the inspection pits, but other railway features that survived below ground level included the remains of two trans-shipment sheds, administrative buildings, locomotive workshops and water tanks. In general, all the railway structures had been demolished down to foundation level and the associated

machinery and fittings salvaged, so that there was very little diagnostic evidence left of their original functions.

The disappearance of railway infrastructure which no longer serves a useful function on the modern network, particularly those related to the building and servicing of locomotives, has been recently highlighted (Palmer *et al*. 2012, 258). Marshalling yards are particularly vulnerable; at the time of Nationalisation there were 94 hump marshalling yards, but by 1972 there were only 35. Most of the artefacts relating to marshalling yards have been destroyed.

Stratton and Trinder state that marshalling yards are '*monuments to the need for complex sorting of wagons that were intrinsic to conservative patterns of railway operation, and to the grandiose ambitions of the 1950s*' (Stratton and Trinder 2000, 167). Railway marshalling yards remain a feature of the British landscape; some have been adapted to meet different demands of modern railway operations, whilst others have been used for housing, for example at Banbury. Other sites such as Whitemoor in Cambridgeshire, and Kingmoor in Cumbria, have become overgrown. Nevertheless, the present project has demonstrated that these can hold a surprising wealth of information regarding the technological and operational aspects of these sites.

Acknowledgements

The authors would like to thank Helen Martin-Bacon, Wardell Armstrong LLP; Kasia Gdaniec, Senior Archaeologist, Cambridgeshire Archaeology Planning and Countryside Advice Service; David Porter and the staff of Cheetham Hill Construction. Grateful thanks are extended to Peter Jackson, the staff at March Museum and Barry Howlett, for sharing their knowledge, experience and recollections of the Whitemoor Marshalling Yard site. Thanks are also due to Blaise Vyner, Dr P Mills and Dr J Evans for their reporting on the Roman pottery, Tony Kirby for his comments regarding the history of the railway and to Guy Thompson of Pre-Construct Archaeology Ltd (PCA) for providing details of recent archaeological work at King's Cross, London.

Glossary

from The Archaeology of Railways by Richard Morriss, 2003

Down: The direction of most routes are referred to as being 'up' or 'down' rather than geographic. 'Down' usually means down from London or from another major centre.

Dunnage: Packing material used to protect cargo during transportation

Hump Yard: Marshalling yard in which shunting can be carried out by gravity by building a rising gradient and allowing individual wagons to roll down from the top into the required siding.

Marshalling Yard: Sidings in which trains are made up or 'marshalled' by shunting wagons around. Larger ones have arrival, shunting and departure sidings.

Reception Sidings: Sidings in which goods trains can be accommodated away from running lines to await sorting in the marshalling yard.

Siding: A section of track used to store, load or marshall trains or separate pieces of rolling stock.

Sorting Siding: Main sidings in a marshalling yard in which individual wagons are sorted and coupled into trains.

Turntable: Short rotating section of track on which rolling stock can be turned around. Used especially from locomotives but in early days of steam also for wagons and coaches

Up: Opposite direction to 'Down', usually meant up to London or another major centre or junction.

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