# AN ARCHAEOLOGICAL WATCHING BRIEF ON A NEW PUMPING STATION AND SIX PIPELINES FOR STRATFORD BOX DEWATERING SCHEME, LONDON BOROUGHS OF HACKNEY, NEWHAM, TOWER HAMLETS AND WALTHAM FOREST

**SITE CODES: SBV09, TSI09, TSJ09, TSK09, TSL09, TSM09, TSN09**

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# An Archaeological Watching Brief on a new Pumping Station and Six Pipelines for Stratford Box Dewatering Scheme, London Boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest

**Pumping Station Site Codes:** SBV09
**Pipeline Site Codes:** TSI09, TSJ09, TSK09, TSL09, TSM09, TSN09

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# CONTENTS

# 1 SUMMARY

1.1 Pre-Construct Archaeology Ltd was commissioned by Thames Water Utilities Ltd to carry out an archaeological watching brief on groundworks for a pumping station and six pipelines for Stratford Box Dewatering Scheme. Stratford Box is the main international railway station for the Channel Tunnel Rail Link (CTRL) in East London. An actively pumped groundwater control system is being installed to protect the CTRL Stratford Box International Station against flooding. The Pumping Station will take water from a collection of 22 boreholes at the International Station. The water will be stored in Thames Water's reservoirs at Walthamstow for use by the capital.

1.2 The Stratford Box Pumping Station was constructed in the London Borough of Newham, while the six associated pipelines pass through the London Boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest along the valley of the River Lea (also spelt Lee). In addition a number of test pits were excavated for the purpose of re-lining existing pipes. The watching brief was carried out intermittently from 28th January 2009 to 26th February 2010 in accordance with two Written Schemes of Investigation: one for Stratford Box Pumping Station (Matthews 2009) and the other for the pipelines (Hawkins 2009). These were agreed by David Divers, English Heritage Greater London Archaeological Advisor.

1.3 Made-ground deposits of 19th and 20th century date were found in the majority of the pipeline trenches and test pits and within the foundation trench for the Stratford Box Pumping Station. These overlay alluvial clay in most cases where excavation was deep enough. In several places layers of gravel and sand overlay the alluvial clay and were covered by the made ground. These were interpreted as former gravel paths. One test pit (Test pit 3) exposed a buried soil with no evidence of human occupation or intervention at 1.7m below ground level. Within the foundation trench for the Stratford Box Pumping Station alluvial clay overlay natural sands and gravels.

1.4 No deposits or features of archaeological significance were observed during the watching brief.

# 2 INTRODUCTION

## 2.1 Project Background

2.1.1 Pre-Construct Archaeology Ltd was commissioned by Thames Water Utilities Ltd to carry out an archaeological watching brief on groundworks for a pumping station and six pipelines for Stratford Box Dewatering Scheme. Stratford Box is the main international railway station for the Channel Tunnel Rail Link (CTRL) in East London (**Figures 1** and **2**). An actively pumped groundwater control system is being installed to protect the CTRL Stratford Box International Station against flooding. The Pumping Station will take water from a collection of 22 boreholes at the International Station. The water will be stored in Thames Water's reservoirs at Walthamstow for use by the capital.

2.1.2 The Stratford Box Pumping Station was constructed in the London Borough of Newham, while the six associated pipelines pass through the London Boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest along the valley of the River Lea (also spelt Lee). The watching brief was carried out intermittently from 28th January 2009 to 26th February 2010 in accordance with two Written Schemes of Investigation: one for Stratford Box Pumping Station (Matthews 2009) and the other for the pipelines (Hawkins 2009). These were agreed by David Divers, English Heritage Greater London Archaeological Advisor (hereafter referred to as the Curator). The watching brief was also undertaken in accordance with guidance given in the document by the Institute for Archaeologists *Standards and Guidance for an archaeological watching brief* (1994, updated 2008).

## 2.2 Site Location

### Pipeline A (Site Code TSI09)

2.2.2 Pipeline A was excavated along the west side of the Lea (also spelt Lee) Valley within the London Borough of Waltham Forest close to its western boundary with the London Borough of Haringey (**Figure 1**). Tottenham lies to the west of Pipeline A while Waltham Forest lies to the east. The northern end of Pipeline A lies some 120m to the north of Ferry Lane/Forest Road between Coppermill Stream to the west and Low Maynard Reservoir to the east. This part of the pipeline trench was aligned north-south. A single lane service road lay 3m to the east of the pipeline trench with Low Maynard Reservoir beyond. To the south of Ferry Lane/Forest Road, six test pits (TP 15-20) were excavated along the route of the pipeline, which turned west running beside the railway line before turning south under the railway line and finishing near the south end of Bream Close. Two test pits (TPs 15 and 16) were excavated just before the pipeline turned south to pass beneath the railway line some 90m to the south of Ferry Lane/Forest Road. One test pit (TP 17) was excavated in the road beneath the railway line. Three others were excavated to the south of the railway line.

### Pipeline B (Site Code TSJ09)

2.2.3 Pipeline B lies to the south of Pipeline A along the west side of the Lea Valley (**Figure 1**). Its northern end lies in the London Borough of Waltham Forest close to its western boundary with the London Borough of Hackney, while its southern end, to the south of the River Lea, lies in the London Borough of Hackney. Upper Clapton lies to the west of Pipeline B while Leyton lies to the east. The northern end of Pipeline B is some 30m to the north-west of Lea Bridge Road. To the south of this road the pipeline trench continued in a south-easterly direction through the former Middlesex Filter Beds, now a Nature Reserve, ending at the Hackney Cut, an artificial channel of the River Lea Navigation built in 1770 to straighten and improve the Navigation. The northern end of the Hackney Cut lies just to the south of Lea Bridge Road at the Middlesex Filter Beds Weir, where excess water flows into the River Lea which flows to the east of the Hackney Cut.

**Pipeline C (Site Code TSK09)**

2.2.4 Pipeline C, to the south of Pipeline B, was excavated along the west side of the Lea Valley within the London Borough of Hackney (**Figure 2**). It lies in Hackney Marsh, just to the east of the Hackney Cut, with Lea Bridge to the west and Leyton to the east.

**Test Pits 1 to 8 (Site Code TSK09)**

2.2.5 Eight test pits (TP 1-8) were excavated as part of the re-lining of existing pipes along the east side of the Hackney Cut between Pipelines C and D (**Figure 2**). These lie along the west side of the Lea Valley within the London Borough of Hackney.

**Pipeline D (Site Code TSL09)**

2.2.6 Pipeline D, to the south of Pipeline C, was excavated along the west side of the Lea Valley within the London Borough of Hackney (**Figure 2**). Its northern end lies to the north of Homerton Road in Hackney Marsh, just to the east of the Hackney Cut. It runs south to Homerton Road, and then west along Homerton Road before turning south-east across Mabley Green. Here another section of pipeline was proposed to run south-east to southwest along Mabley Green, parallel to East Cross Route between Edmeston Close raw water pumping station and the junction of Eastway and Lee Conservancy Road. This section between Eastway and Edmeston Close was intended to be an open trench, but instead the new pipeline was placed using direct drilling methods. Three test pits (TP 9-11) necessary for this method were monitored and recorded.

**Pipeline E (Site Code TSM09) and Stratford Box Pumping Station (Site Code SBV09)**

2.2.7 Pipeline E and the new Stratford Box Pumping Station lie to the south-east of Pipeline D on the east side of the Lea Valley (**Figures 2** and **3**). They are situated in Stratford to the west of Hackney Wick in the London Borough of Newham to the east of the London Borough of Hackney. They lie to the south-west of Stratford International Railway Station, to the north of Carpenters Road (A115) and to the east of Waterden Road.

**Pipeline F (Site Code TSN09)**

2.2.8 Pipeline F lies to the west of Pipeline E and the new Stratford Box Pumping Station and to the south of Pipeline D (**Figure 2**). Its northern end lies at the junction of Eastway with Chapman Road. It then runs south-east along Chapman Road, then south along Wansbeck Road and Wick Lane then east along the Greenway Walk to the new Old Ford Pumping Station. The northern part of the pipeline (north of Wansbeck Road) lies in the London Borough of Hackney, while most of the southern part (south of Chapman Road and west of the River Lea) lies in the London Borough of Tower Hamlets and its very southern end, west of the River Lea, lies in the London Borough of Newham.

# 3 GEOLOGY AND TOPOGRAPHY

3.1 The pipeline as a whole runs roughly north-west south-east in the Lea Valley, with trenches excavated intermittently over a distance of around 10 kilometres. It lies amongst the braided channels of the River Lea, which flows southwards towards its confluence with the Thames about five kilometres from the southern end of the pipeline.

3.2 The British Geological Survey map (Sheet 256) for the area indicates that

Pipeline A lies on alluvium;

Pipeline B lies on alluvium/made ground;

Pipeline C lies on alluvium/made ground;

Pipeline D lies on alluvium;

Pipeline E and the new Stratford Box Pumping Station lie on alluvium; and

Pipeline F lies on London Clay, Taplow Gravel, Kempton Park Gravel and Alluvium at different places along its route.

3.3 Much of the pipeline ran along modern roads and encountered made-ground as well as frequent modern service trenches. However, some of the pipeline ran across parkland such as Mabley Green and the Greenway where soils and subsoils were observed.

# 4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

4.1 Human activity from all periods has been found in the Lea Valley including Neolithic farms, Roman roads, Saxon fish ponds and medieval monasteries. For this reason most of the Lea Valley has been designated an Archaeological Priority Area; all of the pipelines and the Stratford Box Pumping Station lie adjacent to or within Archaeological Priority Areas as defined in the various Borough's Unitary Development Plans. The pipelines and the Stratford Box Pumping Station do not lie within any Scheduled Monuments.

4.2 Prehistoric archaeological deposits and remains, in particular, have been found within the alluvium - the silt deposits, several metres thick, in ancient stream beds of the Lea Valley. The Lea Valley has evidence for Bronze Age settlement in the form of crannogs; dwellings set on piles driven into the wetlands. Settlements are known at Low Maynard Reservoir (discovered in 1869) and Warwick Reservoir. The former was associated with Bronze and Iron Age pottery and lies just to the east of the northern end of **Pipeline A**.

4.3 The Lea was likely to have been an important route in the Roman period. It may have been used to supply the London area with agricultural produce. A Roman stone causeway has been found in Hackney Marsh, which lies just to the east of **Pipelines C** and **D**. Excavations have established that a Roman settlement existed at Old Ford at a point where a north-east to south-west aligned Roman road from London to Colchester forded the River Lea, close to the south end of **Pipeline F**, and at the time was the most downstream, crossing point of the River Lea. The settlement had a role as an interchange point between road and river traffic. Timber buildings were found consisting of postholes and beam slots showing that a fairly substantial roadside ribbon development existed from the 1st century AD. The road was used for the transportation of food from Essex and East Anglia to Londinium. A large amount of cattle bone with evidence of butchering, as well as many coins found, suggest that Old Ford might well have been primarily a market, with the trading of cattle, as well as slaughtering, for sale in Londinium. An extensive agricultural landscape skirted the Roman road; represented by a complex series of ditches, which were dug as field boundaries. Finds of pottery, coins and metalwork from the ditch fills indicate their use up to the 4th century. A Roman cemetery has been found related to the settlement at Old Ford. A group of four inhumation burials were found situated 50m north of the road and could be a small family burial plot. A scatter of other such burials has been found in the past including two stone sarcophagi. One sarcophagus contained two inhumations. A communal burial ground was also excavated containing sixty seven graves. The acidic soil limited bone survival and no grave goods were found.

4.4 Several place names in the Lea Valley have Saxon origins. Hackney derives from Saxon words, which refer to the well-watered meadows by the River Lea marshes, Clapton means the 'farm on the hill' and Leyton also has its origins in Saxon words meaning 'settlement on the Lea'. Evidence for a Saxon settlement was found at Old Ford. It is likely that the Roman crossing at Old Ford and the course of the Roman road/causeway across the marshes and valley remained in use during much of the Saxon period.

4.5 The medieval period is well represented in the Lea Valley. The medieval Cistercian Abbey of Stratford Langthorne was built on the Stratford marshes in 1135. The stone foundations of the abbey church and part of the cloister buildings were excavated. Some 647 human inhumations were discovered within the church and graveyard from around the abbey. The abbey was formally surrendered to the Crown in 1538 at the Dissolution instigated by Henry VIII. Post-Medieval cartographic evidence suggests that medieval buildings may be located along the course of Wick Lane, near **Pipeline F**.

4.6 The use of the waterways as a raw material for industry, a means of transport and as a source of power for the operation of mills remained a major theme in the area's later development. The River Lea was particularly important for the transport of grain from Hertfordshire to London. Improvements were made to the river from 1424, which resulted in the creation of the River Lee Navigation, a canalised river incorporating the River Lea. The Hackney Cut is an artificial channel of the River Lee Navigation built in 1770 to straighten and improve the Navigation. It begins by the Middlesex Filter Beds Weir, below Lea Bridge.

Excess water from the Navigation passes over the weir into the former natural channel of the River Lea that passes in a large meander to the east of the Hackney Cut.

4.7 **Pipelines B, C** and **D** all lie adjacent to the Hackney Cut. **Pipelines B** and **C** pass through the Middlesex Filter Beds. In 1852, three years after London's worst Cholera outbreak and the consequent demand for cleaner, safer water, the East London Water Works Company constructed the six Middlesex Filter Beds in order to provide the surrounding areas with purified water, in later years these were augmented by another 19, seven of which are now the Water Works Nature Reserve; formerly Essex Filter Beds. In 1969, after over 100 years in operation, the Middlesex Filter Beds had become outdated and were replaced by a new Water Treatment Works in Walthamstow. Thames Water became responsible for the beds in 1974 and the site has been leased to the Regional Park since 1988.

4.8 In 1867 two Acts of Parliament were passed which gave powers for the East London Water Works Company to build the High and Low Maynard reservoirs. The north end of **Pipeline A** runs along the west side of Low Maynard reservoir. These reservoirs and those to the south and north (the Lee Valley Reservoir Chain) supply drinking water for London.

# 5 ARCHAEOLOGICAL METHODOLOGY

5.1 The area of the new pipelines was laid out by the contractors, Murphy's, in accordance with the proposed plan. The pipeline routes were adjusted locally as necessary due to obstructions and other ground conditions. Adjustments included either the addition of open-cut trenches or pipe laying by direct drilling methods replaced proposed open-cut trenches.

5.2 The trench for each pipeline was excavated using a mini digger with a flat-bladed ditching bucket; the trench depth ranged from 0.75-2m below current ground level, with a width of 0.6m– 0.8m. Ground reduction was monitored by an archaeologist.

5.3 Test pits ranged in length from 5m-9m and in width from 3m-5m, with a depth range of 1.4m-2.2m.

5.4 Due to the depth and width of the trenches most recording was carried out from the top of the trench. All recording systems employed were fully compatible with those used elsewhere in London; that is those developed from the Department of Urban Archaeology Site Manual, now published by the Museum of London Archaeology Service (MoLAS 1994). Representative sections were drawn along the length of each pipeline on polyester based drawing film at a scale of 1:20. Additionally, sections were drawn of each test pit. Detailed descriptions of all archaeological strata excavated and exposed were recorded on pro-forma recording sheets.

5.5 All recording was measured below modern ground level.

5.6 Excavated spoil was inspected for finds and indications of archaeologically significant deposits where safe to do so.

5.7 Once the pipes had been inserted and welded the trenches were backfilled using the excavated spoil.

5.8 Initially the watching brief was carried out continuously but following the results of the watching brief up to August 2009 set out in an interim report (Harrison 2009); it was agreed with the Curator that the watching brief could be carried out intermittently.

# 6 RESULTS

## 6.1 Pipeline A

6.1.1 The northern end of Pipeline A to the north of Forest Road was approximately 120m in length and was located between the Low Maynard Reservoir to the east and Coppermill Stream to the west (**Figure 1**). It was aligned north – south parallel with a single lane service road 2m to the east. The new water pipeline was 560mm in diameter and was laid in a trench 0.8m wide and 1.5m deep. An area 1m wide on the east side of the trench was also stripped of topsoil to a depth of 0.4m in order to reveal the position of water, electric and telephone services. A water and electric service had to be relaid in the top half of the new trench, once the water pipeline had been inserted and covered with gravel. The trench was then backfilled with the excavated spoil.

6.1.2 No deposits of archaeological significance were found in the pipeline trench to the north of Forest Road. At the southern end of this section, a 0.3m thick layer of topsoil overlay a 0.4m thick layer of made ground with finds of ceramic building material and fragments of pottery dating to the late nineteenth and twentieth century. These no doubt relate to works associated with the road and possibly the construction of the reservoirs themselves in the 1860s. This overlay a layer of blue/grey alluvial clay 1.1m below the ground surface.

6.1.3 These deposits were also observed in a 3m wide square trench excavated to a depth of 2.2m, 5.5m north of Forest Road (Section 28: **Figure 4**; **Plate 1**). This square trench was to facilitate a connection of different diameter pipes as they had to be narrower to fit beneath the road surface to the south.

6.1.4 The layer of made ground only extended for a further 10m northward before it lensed out and was observed to overlay a clay and gravel subsoil layer 0.25m thick. This in turn was above the same alluvial clay deposit that was the lowest layer seen to extend along the length of the trench. The only other feature of note in this section of pipeline was a sand and gravel deposit approximately 80-115m north of Forest Road. This coincided with a lowering in the height of the clay below, to 1.4m below the ground surface, which might suggest this sandy deposit is associated with a previous natural watercourse (Section 30: **Figure 4**, **Plate 2**).

6.1.5 With a reservoir and stream within 10m on each side of the pipeline trench the water table was high and the lowest 0.1 – 0.2m of the trench quickly filled with water as soon as it was excavated. This was also the case with excavations to the south of Forest Road. Just before the pipeline turned south to pass beneath the railway line 90m to the south of Forest Road, two test pits were excavated (test pits 15 and 16).

6.1.6 Test pit 15 was aligned north–south and measured 7.5m by 2.5m and was 1.3m deep. The ground surface was made up of 0.25m thick layer of concrete at a height of 6.82m AOD (Above Ordnance Datum). Below this was a 3m wide cut containing an existing east-west mains water pipe backfilled with a mixed silty clay deposit. The layers cut by the pipe trench consisted of a thin layer of made ground over a much thicker layer of alluvial grey clay, this continued to the base of the trench and water flooded the trench to a depth of 0.5m.

6.1.7 Test pit 16 was excavated just to the northeast of this and was aligned east–west and measured 5m by 0.9m and was 2.4m deep. Like test pit 15 no archaeologically significant features were found in test pit 16. In the base of the trench sat two pipes, the smaller one ran north-west to south-east and was ceramic while the larger one ran north to south and was metal. No construction cuts for these were visible. Ground level was at a height of 8.43m AOD and had a 0.25m thick layer of concrete over a 0.4m layer of brick, gravel and concrete hardcore. This had been laid over a layer of sandy gravel, which was over a layer of brown silty clay at least 1.2m thick, which continued below the base of the excavation.

6.1.8 The excavation of test pit 17, which was located in a private road under the railway line between South Tottenham Station and Blackhorse Road Station, was observed. Here a new length of pipe replaced an existing pipe. The old pipe lay at the base of the trench some

0.9m below ground level. The trench quickly filled with water on excavation. The cut for the existing pipe had been backfilled with gravel. Above a layer of presumably redeposited alluvial grey blue clay was overlain by 20th century made ground, a greyish black sandy silt containing numerous brick, coal, slate and concrete fragments. This was overlain by a leveling layer of mid brown sandy silt with brick, concrete and pebble fragments for the concrete road above.

6.1.9 Existing pipe was also replaced in test pits 18 to 20; these test pits were therefore not observed.

### 6.2 Pipeline B

6.2.1 Monitoring of this 1.5m deep trench (**Figure 1**) revealed a dark grey brown topsoil, some 0.25m thick, over a light brown silty sand with frequent pebbles, 0.2m thick, over a light grey sandy gravel, 0.1m thick. The latter appeared to have been a former gravel path. It overlay a firmly compacted bedding layer of mid brown gravel and sand lenses, 0.28m thick. This in turn overlay a thick layer of light to mid brown alluvial clay, more than 0.67m thick (Section 22: **Figure 4**).

### 6.3 Pipeline C

6.3.1 Monitoring of the trench (**Figure 2**) revealed late 20th century dumping or ground raising from 0.25m below modern ground-surface, to a depth of 1.4m below ground level. The deposits consisted of a combination of re-deposited clay with brick and concrete rubble. This may relate to the demolition of sewage works in the area. Between 0.25m-0.05m below ground surface was asphalt, above which was a 0.05m thick layer of modern topsoil.

6.3.2 In one area of the trench a slab of concrete was encountered at a depth of 1.2m below ground level with 20th century made ground above. The concrete may relate also to the former sewage works.

6.3.3 At the south end of the trench where it crossed Hackney Marsh gravel surfaces were found at a depth of 1.15m below the ground surface near the base of the trench. These sat on an alluvial clay layer and may have formed a former path. Two layers of sandy silt overlay the gravel surfaces, although they did not contain any dating evidence they are thought to be 20th century in date.

### 6.4 Test Pits 1-8

6.4.1 Test pits 1-8 were dug along the Hackney Cut between Pipelines C and D (**Figure 2**). Test pits 1 and 2, and 4 to 8 had very similar deposits. These pits revealed made-ground 0.2m below the modern ground-surface which extended to the full depth of the test pits, (1.35m-1.7m). The deposit was typically clay or gravel mixed with silt and sand, with frequent brick fragments. Above this deposit was a layer of modern topsoil 0.2m thick.

6.4.2 Test pit 6 revealed an alluvial blueish grey clay deposit at 2.2m below modern ground surface. A deposit at a depth of 2m below ground level, 0.2m thick, was observed on top of the alluvium. It appears to represent a period of ground-raising, probably in the 19th century. Above this layer was a later made-ground deposit from 0.2m below modern ground surface and around 1.8m thick. Sealing this was the modern topsoil (TP6, **Figure 4**).

6.4.3 Test pit 3 revealed a deposit at 1.7m below ground-level which comprised friable silty clay with organic inclusions. This possibly represented the original marshy soil of the area before 19th and 20th century ground-raising began. No material was recovered from this deposit to indicate that it related to human activity or showed archaeological potential. Above this layer was 1.55m of mixed redeposited gravel with sand, silt and occasional brick fragments indicating 19th or 20th century ground-raising. This was sealed by modern topsoil 0.15m thick. (TP3, **Figure 4**)

### 6.5 Pipeline D

6.5.1 The section of pipeline running along Homerton Road was not observed (**Figure 2**). A stretch of pipeline trench running from Homerton Road south across Mabley Green towards the south-west corner of this open space was observed. Brown alluvial clay was uncovered at the base of the trench some 1.4m below surface level (8.29m AOD). This was overlain by a disturbed made ground layer of dark brown sandy silt with occasional fragments of brick, pottery, clay pipe, glass and reinforcing steel. These fragments are of 19th and late 20th century date. This was overlain by a further layer of made ground, a mid grey silty sand containing frequent fragments of brick, concrete lumps and small stones. Two further layers of made ground overlay this layer. The made ground layers were sealed by a layer of topsoil.

6.5.2 The section of pipeline running east from Eastway towards Edmeston Close was intended to be an open trench, but instead the new pipeline was placed using direct drilling methods. Three test pits (test pits 9-11) were excavated to facilitate this. The test pits were monitored and recorded.

6.5.3 In test pit 9 late 20th century made-ground was observed from 0.2m below modern ground level to a depth of 2m. Above this was a 0.2m thick layer of modern topsoil.

6.5.4 In test pit 10 late 20th century made-ground was observed from 1.4m below modern ground surface to 2m below ground surface. A layer of asphalt 0.2m thick sealed this, on top of which was another layer of 20th century made-ground that was 1.2m thick. Above this was a 0.2m layer of modern topsoil.

6.5.5 In test pit 11 a silty clay made-ground deposit (context 1) was observed from 1.7m below ground surface, which was 0.3m thick. This deposit had frequent inclusions of glass, pottery and bricks. The pottery present in the layer included an English stoneware ginger beer bottle with Bristol glaze, marked 1896; an English stoneware pierced stopper or stand; a London stoneware pierced top; a London stoneware pipkin handle. The pottery suggests that the made-ground deposit was late 19th century or early 20th century in date. Above this layer was a 0.2m thick layer of asphalt and a 0.10m compacted layer indicating a possible 19th century surface. Above the 19th century surface was a 1.2m thick layer of redeposited silty clay mixed with rubble, which comprised a later phase of ground-raising.

6.5.6 The made ground layers suggest that Mabley Green was landscaped, presumably raised and leveled, in the 20th century.

### 6.6 Pipeline E

5.6.1 This section of pipeline ran east from Waterden Road to the new Stratford Box Pumping Station (**Figure 2**). A stretch of this pipeline, which ran along the base of the embankment of the Station Access Road, was monitored. The pipeline was 1m wide and 2m deep. Ground level was at 6.75m AOD. Only modern made ground was uncovered, with late 20th century brick and plastic meshing occurring at the base of the trench.

### 6.7 Stratford Box Pumping Station

6.7.1 At the end of pipeline E a large area for the foundations of the new Pumping Station, roughly 16m east-west and 15m north-south, was excavated to a depth of 1.6m just to the south of the Station Access Road and to the north of Carpenters Road (**Figures 2** and **3**). Five trenches (Trenches 1 to 5 on **Figure 3**) were then excavated to a depth of *c.*3m below ground surface and a circular 8m diameter shaft was excavated to a depth of 8m to the west of the large excavation area. Observation of the soil sequence was impeded by the high water table which meant that the deeper areas filled with water on excavation. Natural sands and gravels were observed 2.9m below ground level in Trench 1. This was sealed by an alluvial clay layer containing moderate chalk flecks. This layer was at a depth below ground level of 2.3m. This was overlain by a modern layer of silty backfill containing steel rods and asphalt, with a layer of redeposited clay above. The ground level for this area was 6.17m AOD.

### 6.8 **Pipeline F**

6.8.1 The full length of this pipeline was observed (**Figure 2**). Where the pipeline ran along the Greenway Walk, a sandy silt subsoil was observed from a depth of 0.2m below ground-level, with a thickness of at least 0.55m. Above this was modern topsoil (Section 2: **Figure 4**; **Plate 3**).

6.8.2 Where the pipeline ran along Wansbeck Road re-deposited clay was found at a depth of 0.55m below ground level, which was at least 0.3m deep. This probably represented 19th century ground-raising. Above this was a 0.2m thick deposit of clay mixed with concrete and brick, from a subsequent period of ground-raising. Above this layer was 0.25m of concrete and tarmac associated with the modern ground surface (Section 4: **Figure 4**; **Plate 4**).

6.8.3 At the northern end of the pipeline, at the junction of Chapman Road and Eastway re-deposited clay with brick and plastic within it was observed at 0.3m below ground-level; this was at least 0.45m thick. The inclusions indicated it was 20th century made-ground. Above this deposit was tarmac and concrete associated with the modern ground surface (Section 10: **Figure 4**).

# 7 INTERPRETATION AND CONCLUSIONS

7.1 Made-ground deposits of 19th and 20th century date were found in the majority of the pipeline trenches and test pits and within the foundation trench for the Stratford Box Pumping Station. These overlay alluvial clay in most cases where excavation was deep enough. In several places layers of gravel and sand overlay the alluvial clay and were covered by the made ground. These were interpreted as former gravel paths. One test pit (test pit 3) exposed a buried soil with no evidence of human occupation or intervention at 1.7m below ground level. Within the foundation trench for the Stratford Box Pumping Station alluvial clay overlay natural sands and gravels.

7.2 No deposits or features of archaeological significance were observed during the watching brief.

# 8 ACKNOWLEDGEMENTS

8.1 Pre-Construct Archaeology Ltd would like to acknowledge the assistance of the staff of Thames Water Utilities Ltd, particularly that of Claire Hallybone and Claudia Innes. Murphy's are also acknowledged for their assistance on site. The collaborative role of David Divers of the English Heritage Greater London Archaeological Advisory Service (GLAAS) is also acknowledged.

8.2 The project was managed for Pre-Construct Archaeology Ltd by Helen Hawkins and Charlotte Matthews. The watching brief was undertaken by Sarah Barrowman, Mike Bazley, Amelia Fairman, Malcolm Gould, Matthew Harrison, Denise Mulligan, Aidan Turner, John Payne and Alexander Pullen. This report was written by Mike Bazley, Malcolm Gould and Matthew Harrison. The illustrations were prepared by Hayley Baxter and Jenny Simonson.

# 9 BIBLIOGRAPHY

Hawkins H. 2009 *Written Scheme of Investigation for an Archaeological Watching Brief for Six Pipelines as part of the Stratford Box Dewatering Scheme, London Boroughs of Hackney, Haringey, Newham, Tower Hamlets and Waltham Forest* PCA Ltd unpublished client report

Harrison M. 2009 *An Archaeological Watching Brief for Six Pipelines as part of the Stratford Box Dewatering Scheme, London Boroughs of Hackney, Haringey, Newham, Tower Hamlets and Waltham Forest* PCA Ltd unpublished client report

Matthews C.A. 2009 *Written Scheme of Investigation for an Archaeological Watching Brief at Stratford Box Pumping Station, London Borough of Newham* PCA Ltd unpublished client report

Museum of London Archaeology Service, 1994 *Archaeological Site Manual*

## APPENDIX 1: NMR OASIS FORM

OASIS ID: preconst1-79493

**Project details**

| | |
|---|---|
| Project name | Stratford Box Pumping Station and Pipelines |
| Short description of the project | Pre-Construct Archaeology Ltd was commissioned by Thames Water Utilities Ltd to carry out an archaeological watching brief on groundworks for a pumping station and six pipelines for Stratford Box Dewatering Scheme. Stratford Box is the main international railway station for the Channel Tunnel Rail Link in East London. An actively pumped groundwater control system is being installed to protect Stratford Box against flooding. The Pumping Station will take water from 22 boreholes at the International Station. The water will be stored at Walthamstow for future use. The Pumping Station lies in the London Borough of Newham, while the six pipelines pass through the London Boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest along the valley of the River Lea. In addition a number of test pits were excavated for the purpose of re-lining existing pipes. The watching brief was carried out from January 2009 to February 2010. Made-ground deposits of 19th and 20th century date were found in the majority of the pipeline trenches and test pits and within the foundation trench for the Pumping Station. These overlay alluvial clay. In several places layers of gravel and sand, interpreted as former gravel paths, overlay the alluvial clay and were covered by made ground. One test pit exposed a buried soil with no evidence of human activity at 1.7m below ground level. Within the foundation trench for the Pumping Station alluvial clay overlay natural sands and gravels. No deposits or features of archaeological significance were observed during the watching brief. |
| Project dates | Start: 28-01-2009 End: 26-02-2010 |
| Previous/future work | No / No |
| Any associated project reference codes | SBV09 - Sitecode |
| Any associated project reference codes | TSI09 - Sitecode |
| Any associated project reference codes | TSK09 - Sitecode |
| Any associated project reference codes | TSL09 - Sitecode |

| | |
|---|---|
| Any associated project reference codes | TSM09 - Sitecode |
| Any associated project reference codes | TSN09 - Sitecode |
| Any associated project reference codes | K1983 - Contracting Unit No. |
| Any associated project reference codes | K2166 - Contracting Unit No. |
| Type of project | Recording project |
| Site status | Local Authority Designated Archaeological Area |
| Current Land use | Transport and Utilities 3 - Utilities |
| Monument type | NONE None |
| Significant Finds | POTTERY Post Medieval |
| Significant Finds | POTTERY Modern |
| Significant Finds | CLAYPIPE Post Medieval |
| Significant Finds | GLASS Post Medieval |
| Investigation type | 'Field observation','Recorded Observation','Watching Brief' |
| Prompt | Direction from Local Planning Authority - PPG16 |

**Project location**

| | |
|---|---|
| Country | England |
| Site location | GREATER LONDON NEWHAM STRATFORD Stratford Box Pumping Station, |

| | |
|---|---|
| | Pipelines E and F |
| Site location | GREATER LONDON WALTHAM FOREST WALTHAMSTOW Pipeline A |
| Site location | GREATER LONDON WALTHAM FOREST LEYTON Pipeline B |
| Site location | GREATER LONDON HACKNEY HACKNEY Pipelines B, C, D and F |
| Site location | GREATER LONDON TOWER HAMLETS TOWER HAMLETS Pipeline F |
| Postcode | E9 5DT |
| Study area | 10.00 Kilometres |
| Site coordinates | TQ 36842 84617 51.5433401043 -0.02642405760480 51 32 36 N 000 01 35 W Point |
| Height AOD / Depth | Min: 3.88m Max: 8.00m |

**Project creators**

| | |
|---|---|
| Name of Organisation | Pre-Construct Archaeology Ltd |
| Project brief originator | David Divers |
| Project design originator | Charlotte Matthews |
| Project director/manager | Helen Hawkins |
| Project supervisor | Matthew Harrison |
| Type of sponsor/funding body | Utility Company |
| Name of sponsor/funding | Thames Water Utilities Ltd |

body

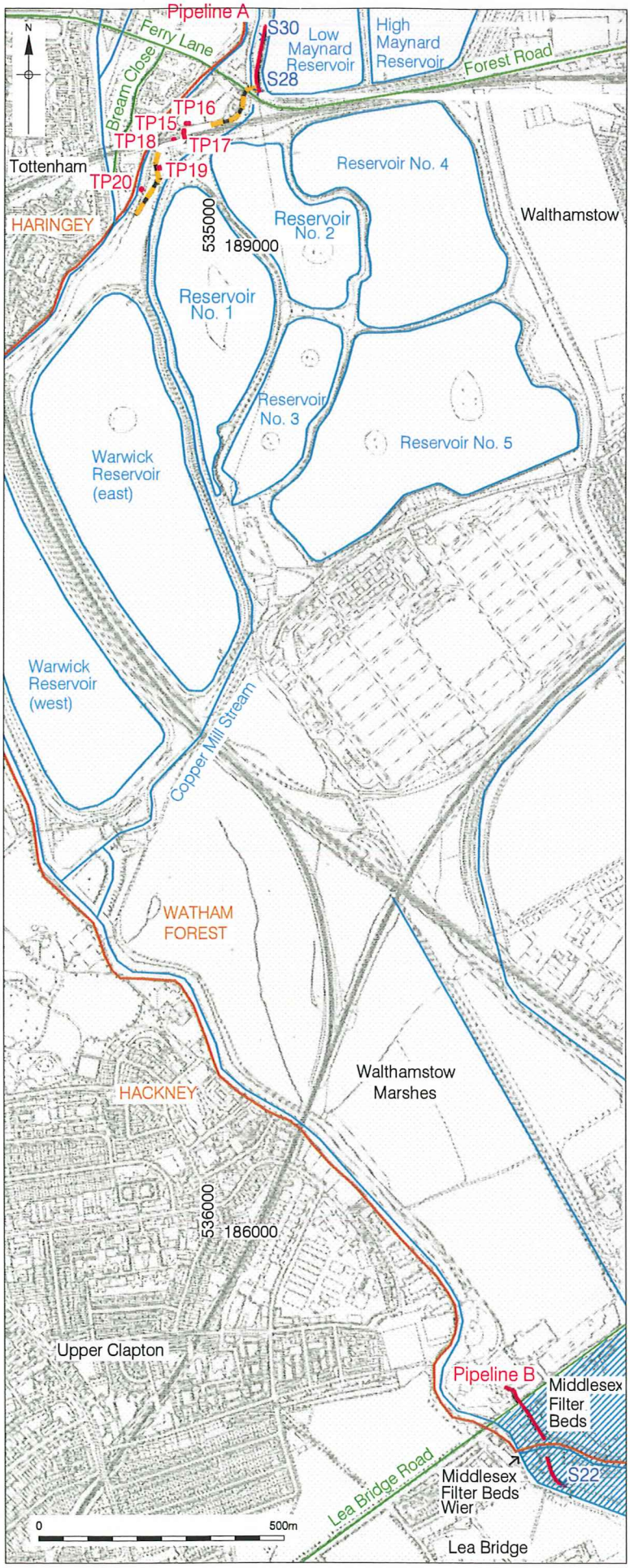
**Project archives**

| | |
|---|---|
| Physical Archive recipient | LAARC |
| Physical Archive ID | TSL09 |
| Physical Contents | 'Ceramics','Glass','other' |
| Digital Archive recipient | LAARC |
| Digital Archive ID | TSI09 TSJ09 TSK09 TSL09 TSM09 TSN09 SBV09 |
| Digital Contents | 'other' |
| Digital Media available | 'Images raster / digital photography','Text' |
| Paper Archive recipient | LAARC |
| Paper Archive ID | TSI09 TSJ09 TSK09 TSL09 TSM09 TSN09 SBV09 |
| Paper Contents | 'other' |
| Paper Media available | 'Context sheet','Notebook - Excavation',' Research',' General Notes','Section','Unpublished Text' |

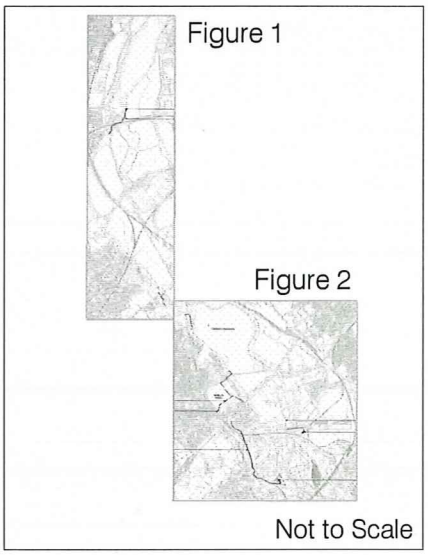
**Project bibliography 1**

| | |
|---|---|
| Publication type | Grey literature (unpublished document/manuscript) |
| Title | An Archaeological Watching Brief on a new Pumping Station and Six Pipelines for Stratford Box Dewatering Scheme, London Boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest |
| Author(s)/Editor(s) | Bazley, M., Gould, M. and Harrison, M. |

| | |
|---|---|
| Date | 2010 |
| Issuer or publisher | Pre-Construct Archaeology Ltd |
| Place of issue or publication | London |
| Description | A4 document |
| | |
| Entered by | Archivist (archive@pre-construct.com) |
| Entered on | 13 July 2010 |






Middlesex Filter Beds
London Borough boundary
Road
Water
Excavated pipeline / test pit
Route of pipeline (not observed)
× Section Location
TP Test Pit

Figure 1
Pipeline & Test Pit Locations
1:12,500 at A4

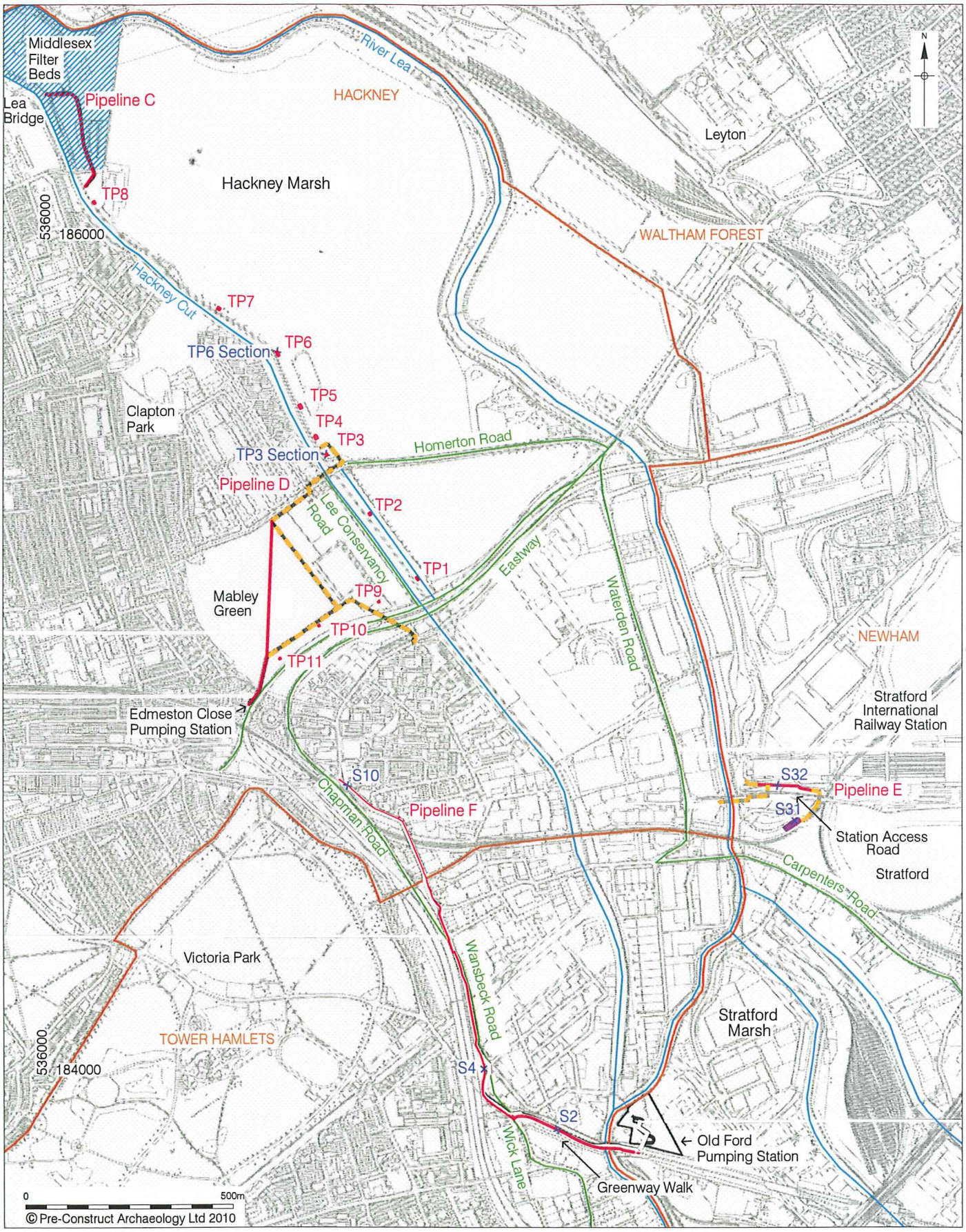



Figure 2
Pipeline,Test Pit and Pumping Station Locations
1:12,500 at A4

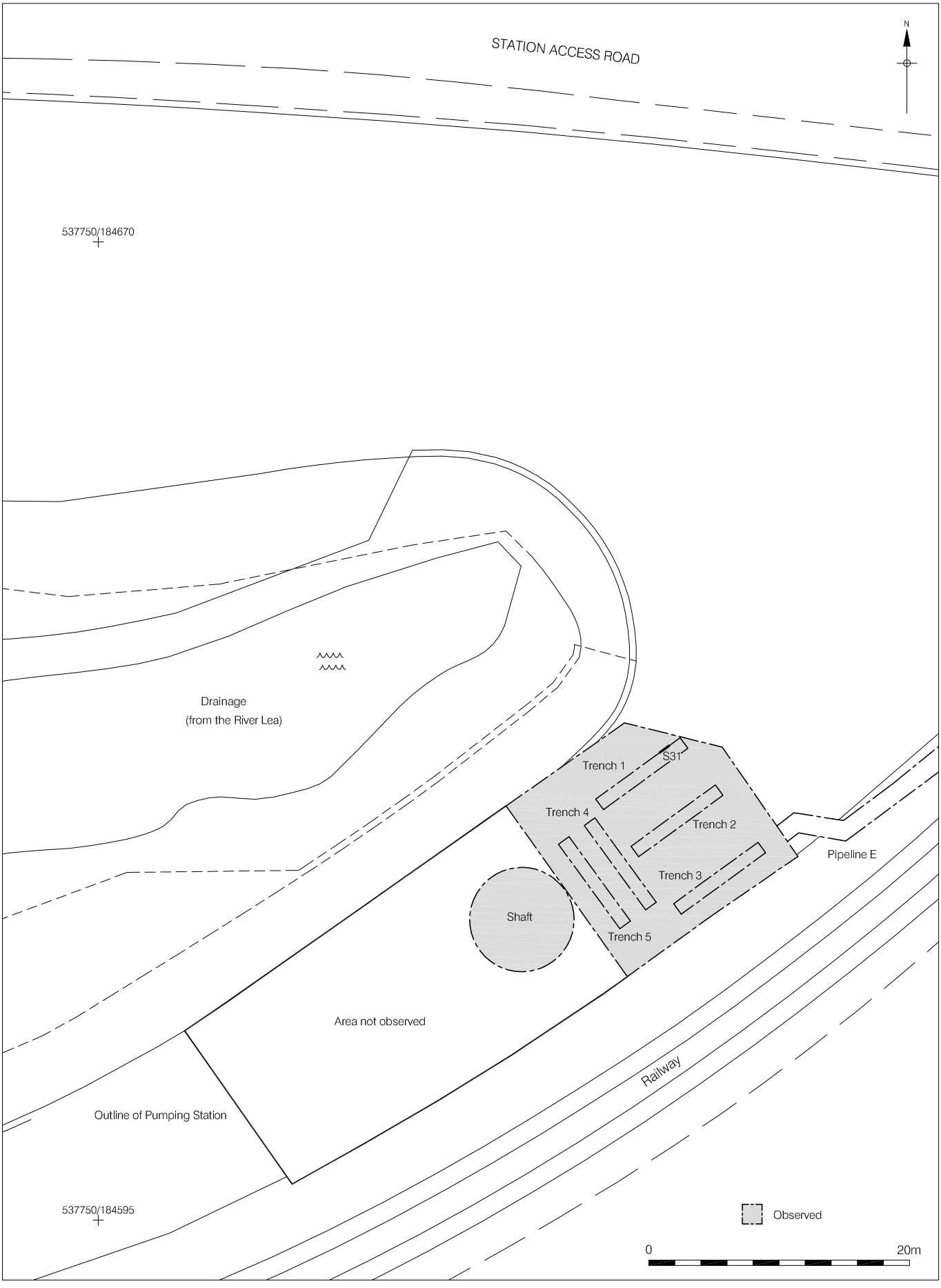
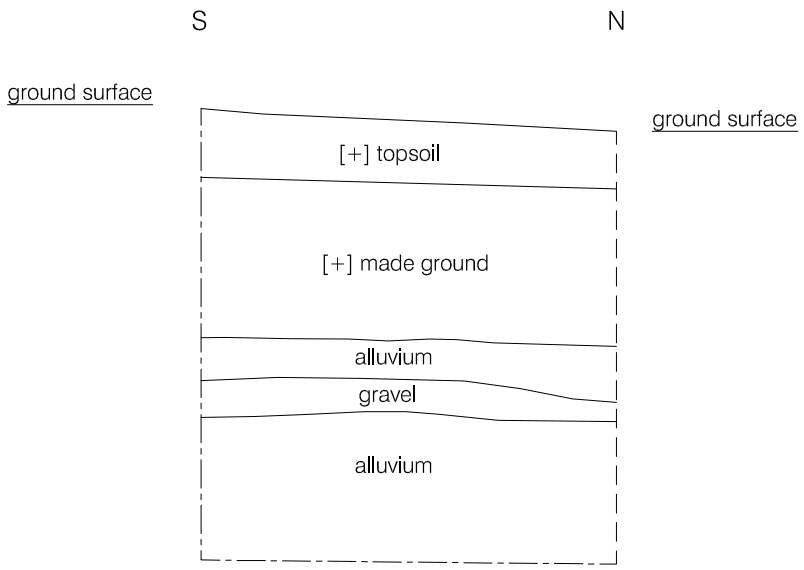


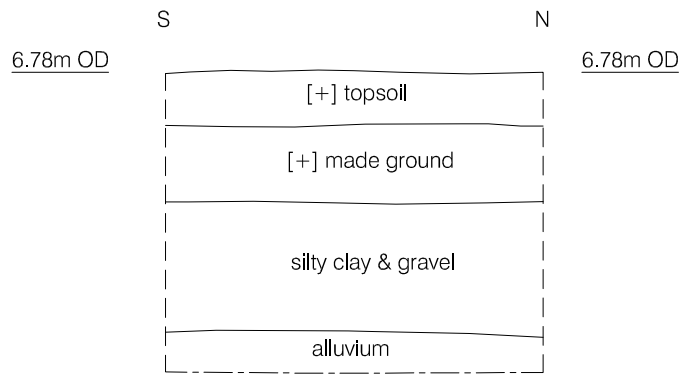




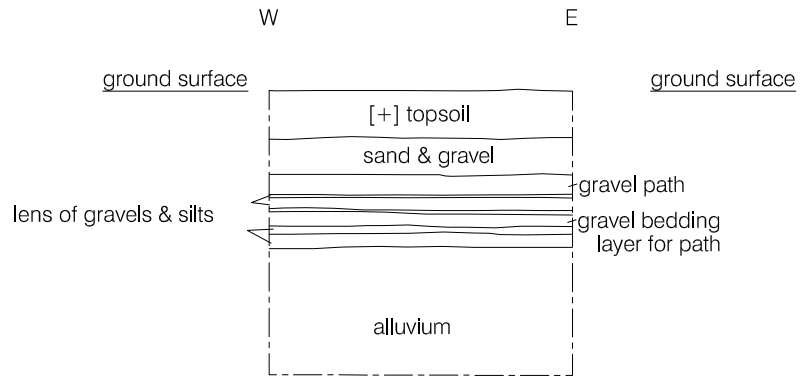

Figure 3
Plan of Pumping Station
1:400 at A4



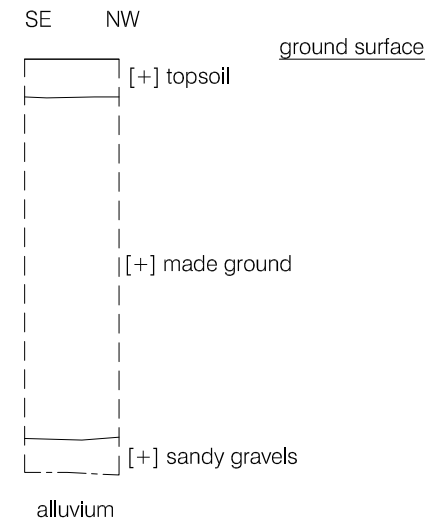

Section 28
Pipeline A
East Facing



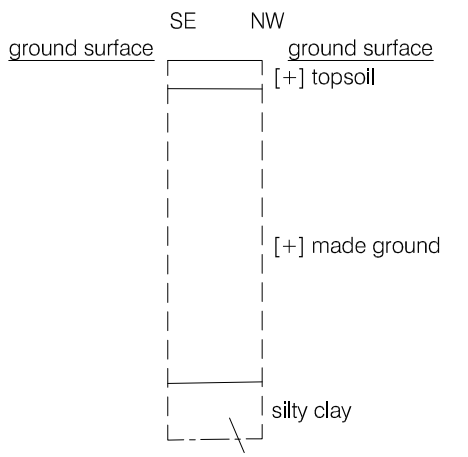

Section 30
Pipeline A
East Facing



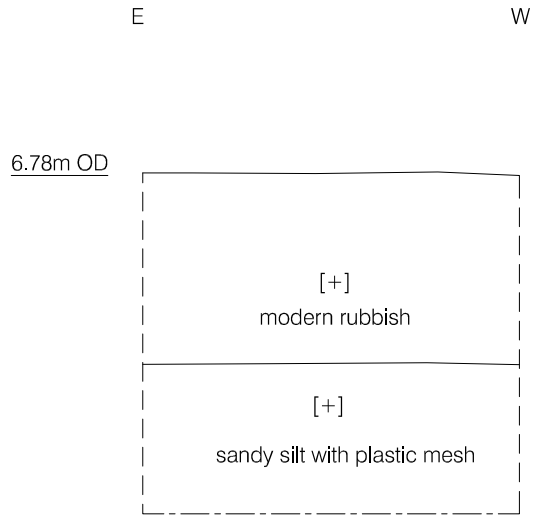

Section 22
Pipeline B
South Facing



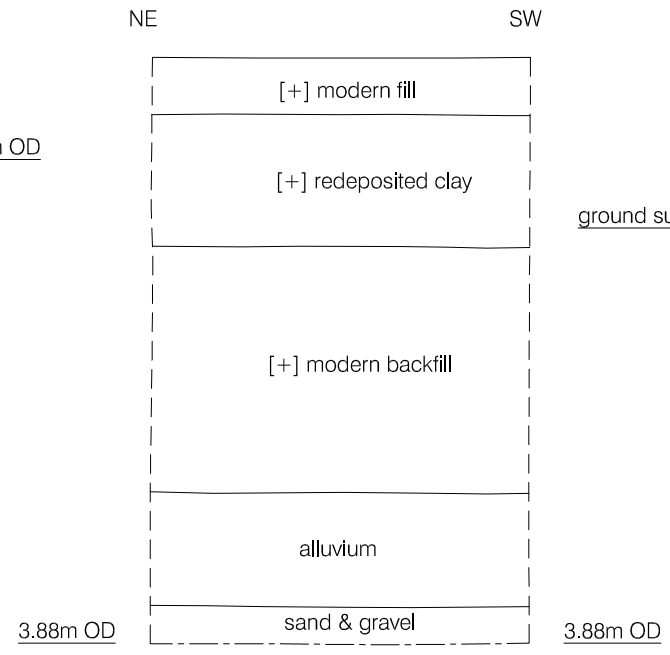

TP6 Section
Northeast facing



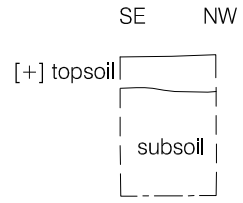

TP3 Section
Northeast facing



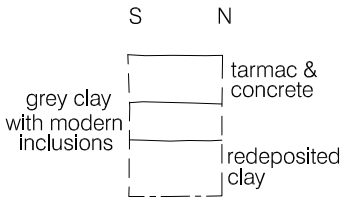

Section 32
Pipeline E
North Facing



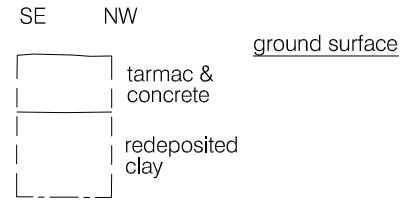

Section 31
Foundation of Pumping Station
Northwest Facing




Section 2
Pipeline F
Northeast Facing




Section 4
Pipeline F
East Facing




Section 10
Pipeline F
Northeast Facing




Figure 4
Sections
1:40 at A3

**PLATES**

**Plate** 1: Pipeline A north of Forest Road, looking west, section 28

**Plate 2:** Pipeline A north of Forest Road, looking south, section 30

**Plate 3:** Pipeline F along the Greenway Walk, looking southwest, section 2

**Plate 4:** Pipeline F along Chapman Road, looking west, section 4

# P C A

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