

British Waterways Scotland

**Forth and Clyde Canal
Lock 17, Underwood
By-Wash Culvert**

Archaeological Watching Brief
January-March 2009



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23 March 2009
Kirkdale Archaeology

Site: Lock 17 on the Forth and Clyde Canal at Underwood

Description: Archaeological Watching Brief during the excavation of three chambers and a pipe track for the installation of a by-wash culvert on the South side of Lock 17

NGR: NS 8053 7897

Contents:

1	Introduction	1
2	Trenching Account and Interpretation	4
3	Conclusion and Recommendations	19
A1.	Appendix 1: Bibliography	20
A2.	Appendix 2: List of Contexts	21
A3.	Appendix 3: List of Drawings.....	21
A4.	Appendix 4: List of Digital Photographs	22

Figures

Figure 1:	Location of Lock 17	1
Figure 2:	Location of Trenches.....	3
Figure 3:	Remains of the Blaze Dam looking NW.....	4
Figure 4:	The End of a Balance Beam found within the Blaze Dam	5
Figure 5:	W-Facing Section S of the E Outlet Chamber	5
Figure 6:	Trench 1 and the Cofferdam looking NNE.....	6
Figure 7:	Looking NE at the completed E Outlet Chamber with fitted Pipe.....	6
Figure 8:	Looking NNE at the re-routed water course (running SE-NW).....	7
Figure 9:	Looking SE at a Section through the breached wall	8
Figure 10:	Looking SSW at the Cast Iron Cover and Red Brick Trap	8
Figure 11:	The E-Facing Section of Trench 2	10
Figure 12:	A Piece of lock furniture found within F208	10
Figure 13:	The W Inlet Chamber looking SW	11
Figure 14:	Looking E at Trench 3 for the E Baffle Chamber.....	11
Figure 15:	The connection between the E Baffle Chamber and E Outlet Chamber	12
Figure 16:	Looking NW at the section of un-jointed revetment wall	13
Figure 17:	The revetment wall after it collapsed	14
Figure 18:	The dog legged pipe from the W Inlet Chamber looking NE	15
Figure 19:	A typical section of the W portion of the pipe track.....	15
Figure 20:	A piece of lock furniture found in F406	16
Figure 21:	The brick outhouse on the S side of Lock 17 looking NNE c.1970s.....	16
Figure 22:	Demolition layers showing the position of the outhouse looking NE.....	17
Figure 23:	Location of services at the foot bridge looking NNW	17
Figure 24:	Trench 4 (E end) showing drain F410	18

1 INTRODUCTION

On behalf of British Waterways, Kirkdale Archaeology was asked to undertake a watching brief during the excavations to install a by-wash culvert on the South side of Lock 17 on the Forth and Clyde Canal at Underwood. Previous watching briefs during the installation of by-wash culverts (at Locks 18 and 19) had been undertaken to the North of the lock chambers on the Tow-Path side of the canal. The location of the by-wash culvert at Lock 17 meant that a permanent watching brief was required during all ground-breaking works, not only due to the Scheduled status of the canal itself but because a desk-based assessment carried out by Kirkdale Archaeology indicated the potential survival of elements of the Antonine Wall just South of the proposed excavations. Various maps showed a double dotted line, generally annotated as 'The Line of the Roman Wall', however it is not clear as to which elements of the wall they were referring and it is further unclear whether the line indicated represented the actual position of a visually identifiable portion of the wall or whether it represented the assumed line of the monument.

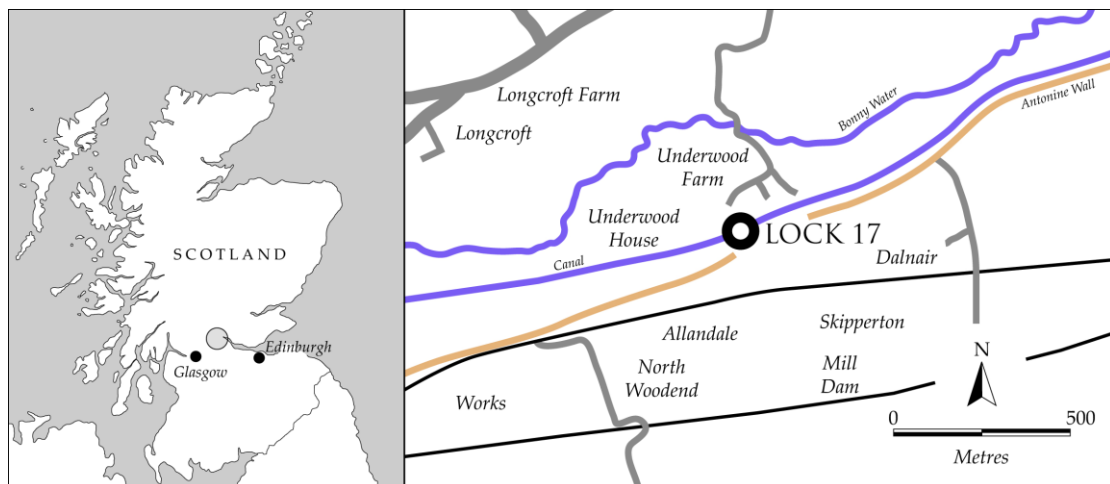


Figure 1: Location of Lock 17

The issue of which element is being indicated is important as the Antonine Wall was composed of several parallel parts. Started in 142AD, it ran from Old Kilpatrick in the West to

Bo'ness in the East. The rampart itself was a sloping turfwork on a stone base (generally 14ft wide) on top of which sat a timber breastwork. To the North of the rampart was a wide strip of land or a berm, 14-20ft wide leading to a 40ft wide, 12ft deep V-shaped ditch. The up-cast from this ditch formed an anterior mound or glacis of variable width on the North side of the ditch – this could be piled up or flat in profile. The material excavated from the ditch therefore did not form the rampart (a turfwork) but rather the anterior mound. To the S of the rampart, a Military Way or road allowed the quick deployment of troops along the length of the wall. (Ward, 1911, p115-116).

The strip of land where the W Inlet Chamber was sited extended for a considerable distance to the W towards the village of Allandale. It was noted that in the central portion of the field to the W there was a discernible waterlogged section containing tall rushes and possibly indicating that the line shown on the maps may be representing the general line of the ditch. Although sections of the wall survive in a good state of preservation e.g. at Bantaskine and Rough Castle, it is largely eroded and ploughed out, often surviving only as faint traces and often not visible at all. The areas stripped of topsoil during the installation of the culvert and the excavations themselves revealed no indication of either the line of the ditch or re-deposited material that could have represented the anterior mound.

Lock 17 and the Underwood Lockhouse and Stables were constructed c.1770. The Lock Chamber has had some of its masonry repaired and the lock gates were restored in 1982. Elements of lock furniture were recovered during the excavations indicating that ground to the E and W of the Lock was at least partially made up. The installation of the by-wash culvert would relieve pressure on the lock gates and allow better regulation of the flow of the canal.

The nature and depth of the excavation work meant that the sections were recorded photographically from a safe vantage point. Photography was used to record the relevant areas both prior to and during the ground-breaking works.

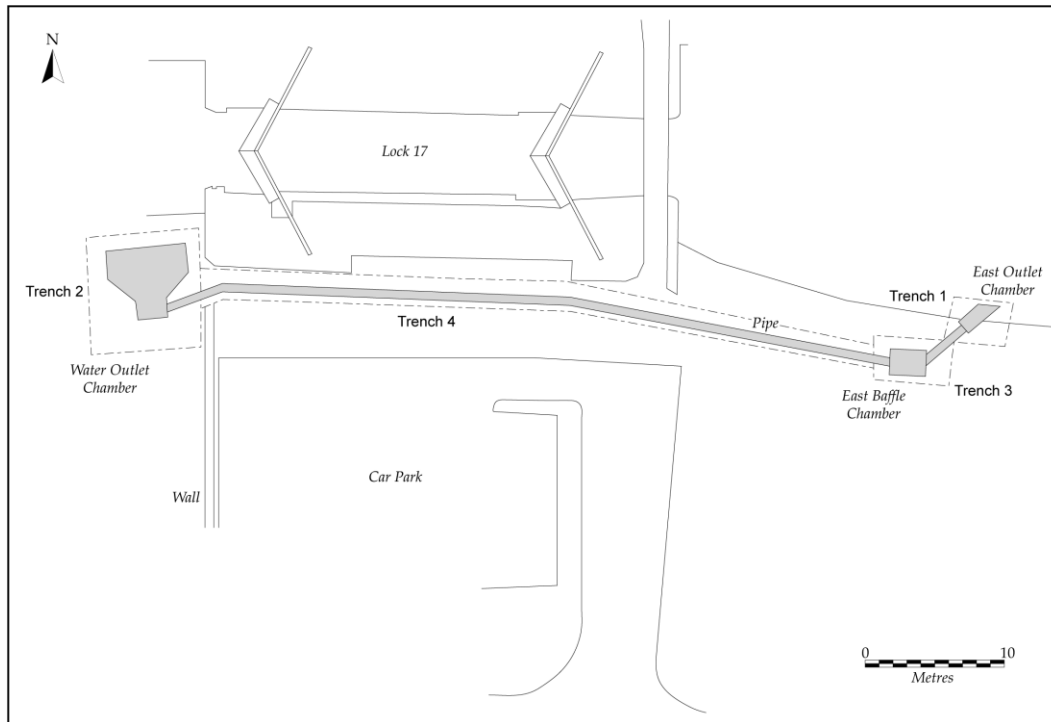


Figure 2: Location of Trenches

2 TRENCHING ACCOUNT AND INTERPRETATION

2.1 Trench 1 – The E Outlet Chamber

The excavation began to the E of the Lock Chamber. The area of land here was heavily vegetated and this was stripped prior to the excavation of the E Outlet Chamber. On removal of the vegetation, a large amount of red blaze was revealed below the topsoil. This contained red bricks and lots of modern rubbish such as plastic cups. This turned out to be the dredged out remains of a blaze dam that had been placed in the canal c.2002 during work on the lock gates.



Figure 3: Remains of the Blaze Dam looking NW

The dam collapsed and had to be dredged out and as a result a piece of lock furniture, probably the end of a balance beam, was dredged out at the same time. The section was composed of a loose dark brown silty topsoil **F101** 120mm deep covering the dumped remains of the red blaze dam **F102**, an undulating layer up to 500mm deep. Below this was a buried dark brown silty topsoil **F103** 100mm deep (the previous ground surface) overlying a 250mm deep compact subsoil layer of greyish-brown silty clay containing numerous oval pebbles <110mm **F104**. Below this was a compact layer of heavy greyish-brown boulder clay

natural containing moderate inclusions of large sub-rounded boulders up to 800mm across F105. This layer was not fully exposed but reached a depth of at least 1.5m.



Figure 4: The End of a Balance Beam found within the Blaze Dam

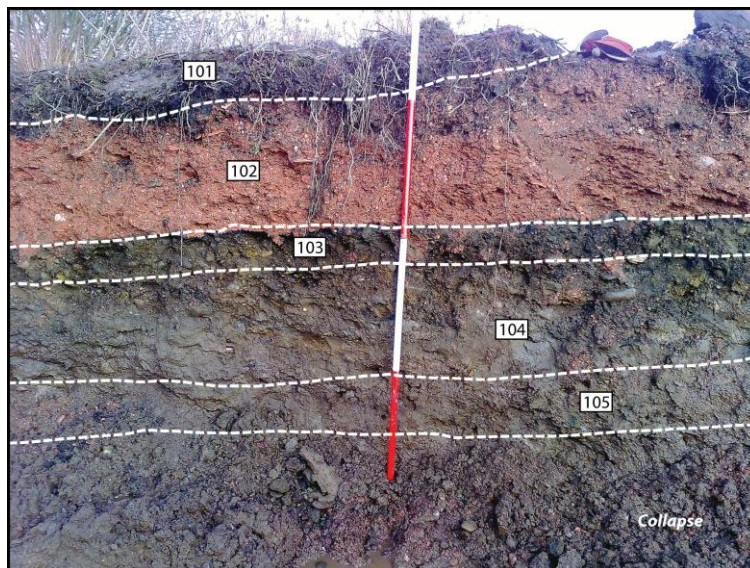


Figure 5: W-Facing Section S of the E Outlet Chamber

As the E Outlet Chamber was situated at the foot of the slope next to the canal edge, a sheet piled coffer dam had to be constructed to keep the water out of the excavation. An area approximately 4m x 4m was excavated to a depth of 800mm and then stepped down by a further 800mm to allow safe access to the excavation. The coffer dam was allowing water through so the excavation had to be pumped out before the concrete base of the chamber

could be laid. The chamber was then constructed and a dogleg of concrete pipe was fitted to connect later to the E Baffle Chamber. The pipe was bedded on a 150mm deep bed of pea gravel and backfilled with unsorted Type 1 stone and finings.



Figure 6: Trench 1 and the Cofferd Dam looking NNE



Figure 7: Looking NE at the completed E Outlet Chamber with fitted Pipe

2.2 Trench 2 – The W Inlet Chamber

Work then started on the excavation for the W Inlet Chamber and this involved a substantial amount of preparatory work including the diversion of a water course running beneath the road to the S and into the canal at the approximate location of the W Inlet Chamber. A

channel 900mm deep was cut from the SE corner of the field and headed NW to the canal and the old water course was filled in. The channel was constantly inundating and it was only possible to take quick photographs of the section – these showed a loose dark brown silty topsoil overlying a pebble-rich greyish brown silty clay subsoil bedded on a compact layer of heavy yellowish-brown natural clay.



Figure 8: Looking NNE at the re-routed water course (running SE-NW)

A loose rubble and silt boundary (more of a bund than a wall) had to be breached at the NW corner of the car park in order to allow access for the digger and dumper truck. Much of the masonry was re-used dressed yellow sandstone and this was bonded in a matrix of dark brown silt, the whole lying on a bed of sandstone rubble.



Figure 9: Looking SE at a Section through the breached wall

Once the area had been graded flat, the excavation for the W Inlet Chamber started. It became clear that the ground here had been disturbed previously. There were several cast iron pipes running from S-N at variable depths of 500mm-1m and a cast iron cover with a brick trap were uncovered 1m W of the breached wall, although it was not necessary to remove this as it was out-with the area of the main excavation. This is likely to have been a septic tank, possibly related to the building shown to the SE of the car park on 19th century OS maps.



Figure 10: Looking SSW at the Cast Iron Cover and Red Brick Trap

An area approximately 8m x 8m was excavated on the sloped ground falling towards the canal – the N portion of the excavation was therefore much shallower than the S side which had a depth of c.2m a step was cut in to allow safe access to the excavation. The E facing section showed that the original cut for the canal was approximately 1.5m back from the current N edge of the S canal bank.

The section was composed of several layers, the uppermost of which was a waterlogged dark brown silty topsoil **F201** 120mm deep. Below this was a 300mm deep layer of compact grey brown sandy clay **F202** with numerous oval pebble inclusions <120mm. This sat on a compact clean layer of heavy mid greyish brown clay **F203** 300mm deep overlying a compact band of orange brown sandy gravel **F204** 250mm deep. Below this was a 400mm deep layer of compact pinkish grey Sandy Clay **F205** with numerous small pebble inclusions <80mm overlying a compact band of heavy greyish brown boulder clay **F206** 250mm thick. A further compact band of orange brown sandy gravel **F207** 250mm deep lay below **F206**. The bank to the N was composed of material dredged up from the canal bed. The material was a waterlogged layer of mid-grey silt and clay **F208** containing numerous pieces of timber and a further piece of lock gate furniture, showing that the N portion of the bank had been graded up, possibly when the lock was being restored in 1982 or 2002.

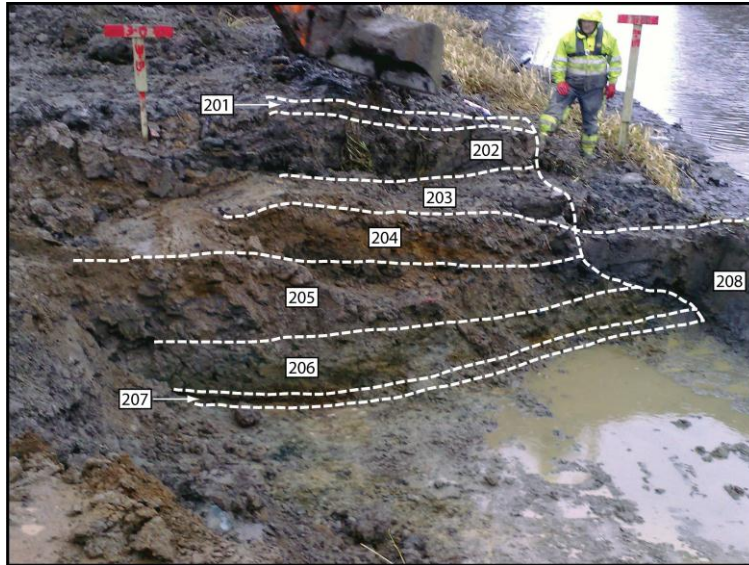


Figure 11: The E-Facing Section of Trench 2 – Note the dredged material to the right



Figure 12: A Piece of lock furniture found within F208

The regular layout and integrity of F201-F207 showed that these were layers of naturally formed strata- there was no indication of re-deposition that would have been consistent with the structure of the anterior mound of the Antonine Wall.



Figure 13: The W Inlet Chamber looking SW

2.3 Trench 3 – The E Baffle Chamber

While the excavation for the W Inlet Chamber was being dressed for the installation of the concrete structure, the area of the E Baffle Chamber was excavated.



Figure 14: Looking E at Trench 3 for the E Baffle Chamber

The trench was approximately 3.5m E-W x 2.5m N-S and reached a depth of 2.5m (the area had been previously stripped and graded). The N-Facing section was composed of a loose dark brown silty topsoil F301 120mm deep covering the dumped remains of the red blaze dam F302, an undulating layer up to 500mm deep. Below this was a buried dark brown silty

topsoil F303 100mm deep (the previous ground surface) overlying a 250mm deep compact subsoil layer of greyish-brown silty clay containing numerous oval pebbles <110mm F304. Below this was a compact layer of heavy greyish-brown boulder clay natural containing moderate inclusions of large sub-rounded boulders up to 800mm across F305. This layer was not fully exposed. Nothing of archaeological interest was revealed.



Figure 15: The connection between the E Baffle Chamber and E Outlet Chamber

The excavation was dressed and the concrete chamber emplaced and connected by a 5m run of concrete pipe to the E Outlet Chamber.

2.4 Trench 4 – The Pipe Trench

The final excavation was the cut to connect the W Inlet Chamber to the E Baffle Chamber. The pipe line ran 69m from W-E and was started on the W Side. The excavation was typically 3m deep and 2m wide. As each 3m long section was dug a safety box was placed into the excavation. A gravel bed 150mm was poured and the pipe was placed in and backfilled. The next section was then excavated and the pipes fitted together. In an amendment to the original design, it was decided to dog leg the pipe from the W Inlet Chamber to the NW, this

would allow the pipe to run through the N parking bays of the car park and would prevent the tarmacadam surface of the car park from being disturbed.

The excavation would begin in the W and would then move to the E, with the central portion being dug out last to make the connection between the two sides of the pipe track. The initial excavation was problematic as a section of wall was uncovered, blocking the run of the pipe trench.

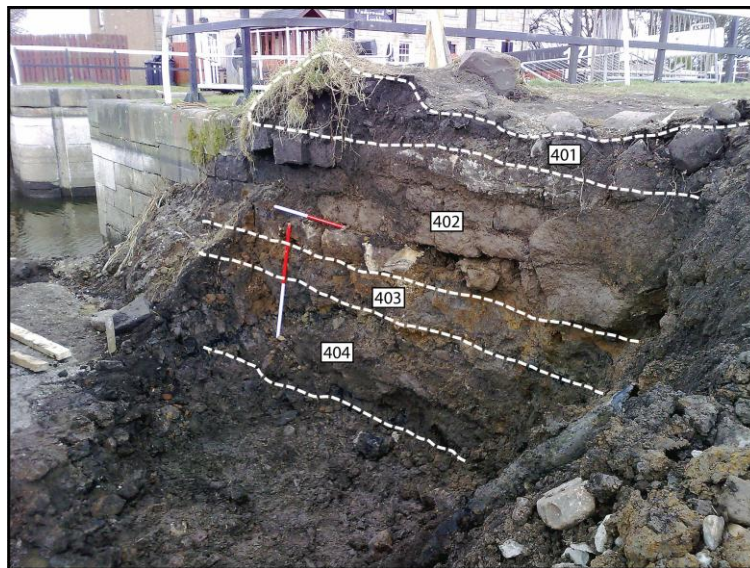


Figure 16: Looking NW at the section of un-jointed revetment wall

The excavation of Trench 2 had required the breaching of the bund **F401** forming the W boundary of the car park, this was composed of re-used dressed yellow sandstone blocks bonded in a matrix of dark brown silt 1.25m E-W x 750mm high, the whole lying on a bed of sandstone rubble 100mm deep. Below this, the section of wall **F402** was exposed. It was composed of 3 courses of un-jointed rectangular yellow sandstone blocks with stippled dressing 600mm high sitting on a protruding base course of un-jointed rectangular yellow sandstone blocks with stippled dressing 200mm high and protruding at the base by 50mm. The wall sat on a bed of yellowish brown sand and sandstone rubble **F403** 100mm deep, this in turn sat on a layer of very compact heavy mid-grey puddle clay **F404**, exposed to a depth of 750mm. This section of wall was keyed into the SW wall of the lock chamber so it seems

likely, especially given that the wall has puddle clay running below, that this was an original part of the 18th century design. It was likely to have been a revetment bridging the sloping section of ground from the S side of the Lock Wall to the made up ground forming the flat area to the S of the Lock. Unfortunately a matter of minutes after it was exposed, it started to collapse.



Figure 17: The revetment wall after it collapsed

As the wall had become dangerous, overhanging the excavation, it was agreed with HS that it could be breached. The S portion was kept largely intact and the cut for the pipe trench continued. As the wall collapsed it exposed the section which showed that the wall was 500mm wide and was backed with a layer of compact grey clay 250mm thick F405.

The initial dog legged pipe was laid and this allowed the excavation to continue in a straight line from W-E.



Figure 18: The dog legged pipe from the W Inlet Chamber looking NE

The pipe track was initially excavated from W to E. There were variations within the section to suggest that parts of the upper surface had been disturbed.



Figure 19: A typical section of the W portion of the pipe track

As part of the restoration of the Lock, new posts had been dug in and it was clear that the upper 300mm was made up at this time - it was composed of **F406**, a layer of Type 1 stone. It also contained a remnant of the previous lock gate. The base of the excavation showed that the puddle clay sealing the lock chamber sat on a compact layer of heavy yellowish-brown natural clay **F407**.



Figure 20: A piece of lock furniture found in F406

8m into the pipe track excavation there were several layers of demolition debris **F408** composed of red bricks, mortar and sand sitting within a sloping cut **F409** up to 500mm deep. These were likely to represent the remains of a brick outhouse photographed in the 1970s.



Figure 21: The brick outhouse on the S side of Lock 17 looking NNE c.1970s



Figure 22: Demolition layers showing the position of the outhouse looking NE

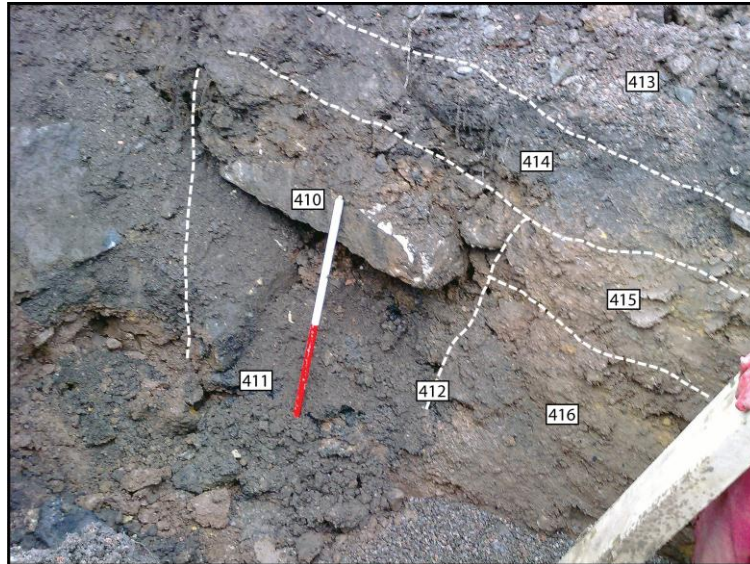
Thereafter the section was disturbed in several places. To the E, the make-up of the car park and drainage systems had truncated a large part of the upper section while at the footbridge, 4 different services comprising Gas, Waste, Water and British Telecom had to be located. These were hand dug and recorded photographically in relation to the bridge.



Figure 23: Location of services at the foot bridge looking NNW

In the E portion of the Pipe Trench, one feature was uncovered 10m E of the SE wall of the Lock. A slabbed field drain **F410** composed of coursed sandstone side walls with large sandstone caps was breached while cutting the track. Its base coincided with the depth of the

base of the track and it contained a mid grey silty fill **F411**, 60mm deep. The aperture of the drain was 750mm high x 500mm wide. No water inundated the trench, indicating that the drain was no longer in use.



*Figure 24: Trench 4 (E end) showing drain **F410***

To the E of the lock chamber, the section reverted back to that seen in Trenches 1 and 3. The field drain **F410** was cut (via **F412**) through sub-layers **F415** and **F416** and was covered by the buried topsoil **F414** below the remains of the blaze dam **F413**.

No other features of interest were noted. The E and W tracks were joined and the pipe was fitted and backfilled.

3 CONCLUSION AND RECOMMENDATIONS

The one unusual feature recorded as part of the watching brief was the section of wall extending S from the SW corner of Lock 17. The locks usually stop at the corner of the chamber wall, however this addition is due to the development of the land to the S side of the lock. The making-up of this section of land to be flat and level with the top of the lock chamber meant that there was a disparity in height between this heightened ground level and the sloping ground to the W. This simple revetment was therefore placed there to bridge the gap between the ground levels. It seems likely that this wall would have stood to a greater height to act not only as a revetment but as a boundary. It may be that the later bund that sat over it was composed of the collapsed remains of this wall, piled up with silt to create a later boundary. The watching brief afforded the chance to record the feature photographically before it collapsed.

Like the previous watching briefs at Locks 18 and 19, this work has afforded the opportunity to understand something of the make up and fabric of the monument and to recognise that the land round about it has been subject to change and development over the last 240 years. Any further installation of by-wash culverts should proceed with the same level of archaeological monitoring.

A1. APPENDIX 1: BIBLIOGRAPHY

Lindsay, Jean *'The Canals of Scotland'* Kelley 1968

Ransom, P.J.G *'The Archaeology of Canals'* World's Work 1979

Ward, John *'Romano-British Buildings and Earthworks'* Methuen 1911

A2. APPENDIX 2: LIST OF CONTEXTS

No #	Description
Trench 1	
F101	Dark Brown Topsoil
F102	Red Blaze below F101
F103	Buried Topsoil below F102
F104	Greyish Brown Silty Clay and Pebbles
F105	Greyish Brown Boulder Clay
Trench 2	
F201	Dark Brown Topsoil
F202	Grey Brown Sandy Clay
F203	Mid Grey-Brown Clay
F204	Orange Brown Sandy Gravel
F205	Pinkish Grey Sandy Clay
F206	Greyish Brown Boulder Clay
F207	Orange Brown Sandy Gravel
F208	Banked Up Mid-Grey Silt and Clay
Trench 3	
F301	Dark Brown Topsoil
F302	Red Blaze below F101
F303	Buried Topsoil below F102
F304	Greyish Brown Silty Clay and Pebbles
F305	Greyish Brown Boulder Clay
Trench 4	
F401	Stone and Earth Bund
F402	Buried Revetment Wall
F403	Sand and Rubble below F402
F404	Mid-Grey Puddle Clay
F405	Compact Grey Clay behind F402
F406	Type 1 Layer
F407	Yellowish Brown Clay Natural below F404
F408	Demolition Debris within Cut F409
F409	Demolition Cut
F410	Slabbed Field Drain
F411	Mid Grey Silty Fill of F410
F412	Cut for F410
F413	Red Blaze (same as F102)
F414	Buried Topsoil (same as F103)
F415	Greyish Brown Silty Clay and Pebbles (same as F104)
F416	Greyish Brown Boulder Clay (same as F105)

A3. APPENDIX 3: LIST OF DRAWINGS

No.	Description	Scale
1	General Location Plan of Trenches 1-4	1:125

A4. APPENDIX 4: LIST OF DIGITAL PHOTOGRAPHS

Photo No.	Description	From	Date
1	Pre-Ex shot of heavy vegetation at site of E Outlet and Baffle Chamber	N	12/01/2009
2	E side of Lock 17 looking SW	NE	12/01/2009
3	Pre-Ex shot of heavy vegetation at site of E Outlet and Baffle Chamber	N	12/01/2009
4	Pre-Ex shot of heavy vegetation at site of E Outlet and Baffle Chamber looking SE	NW	12/01/2009
5	Pre-Ex shot showing kerb and car park spaces in the line of the pipe connecting the E and W chambers	E	12/01/2009
6	Pre-Ex shot of ground at the W inlet chamber looking W	E	12/01/2009
7	Pre-Ex shot of ground at the W inlet chamber looking S	N	12/01/2009
8	Pre-Ex shot of ground at the W inlet chamber looking SE	NW	12/01/2009
9	Pre-Ex shot of heavy vegetation at site of E Outlet and Baffle Chamber looking SW	NE	12/01/2009
10	Pre-Ex shot of Lock 17 and the Underwood Lockhouse	SSE	12/01/2009
11	Pre-Ex shot of scrub ground at the W inlet chamber and Underwood Lockhouse looking NE	SW	12/01/2009
12	Pre-Ex shot showing stream running under the road to the SW of the car park (to be diverted)	NE	12/01/2009
13	Pre-Ex shot showing stream running under the road to the SW of the car park (to be diverted)	NE	12/01/2009
14	Lock Chamber (of Lock 17) looking SE	NW	12/01/2009
15	Working Shot post-clearance of heavy vegetation at site of E Outlet and Baffle Chamber	NE	13/01/2009
16	Remains of dredged blaze dam at site of E Outlet and Baffle Chamber	SE	13/01/2009
17	Looking E at machine track at site of E Outlet and Baffle Chamber	W	13/01/2009
18	Working Shot post-clearance of heavy vegetation at site of E Outlet and Baffle Chamber	SE	14/01/2009
19	Work in progress at site of E Outlet and Baffle Chamber	SW	14/01/2009
20	Work in progress at site of E Outlet – steps cut	SW	14/01/2009
21	Work in progress at site of E Outlet – E Facing Section	E	14/01/2009
22	Work in progress at site of E Outlet looking S	N	14/01/2009
23	Sheet Piled Dam at E Outlet Chamber looking NE	SW	15/01/2009
24	Sheet Piled Dam at E Outlet Chamber – W Facing Section	SW	15/01/2009
25	Sheet Piled Dam at E Outlet Chamber – E Facing Section	E	15/01/2009
26	Sheet Piled Dam at E Outlet Chamber looking S	N	15/01/2009
27	Sheet Piled Dam at E Outlet Chamber looking NW	SE	15/01/2009
28	Work in progress at E Outlet Chamber	W	15/01/2009
29	Inundated E Outlet Chamber looking NE	SW	15/01/2009
30	Inundated E Outlet Chamber looking NE	SW	15/01/2009
31	Shot showing dumped blaze dam in section	WNW	15/01/2009
32	End of a balance beam from an old lock gate found within dumped blaze	-	15/01/2009
33	End of a balance beam from an old lock gate found within dumped blaze	-	15/01/2009

Photo No.	Description	From	Date
34	End of a balance beam from an old lock gate found within dumped blaze	-	15/01/2009
35	End of a balance beam from an old lock gate found within dumped blaze	-	15/01/2009
36	Broken timber found within dumped blaze	SW	15/01/2009
37	Access steps at E Outlet Chamber	SW	15/01/2009
38	Pumping water from inundated E Outlet Chamber	SW	19/01/2009
39	Looking NNE at E Outlet Chamber with pump	SSW	20/01/2009
40	E Outlet Chamber emptied with poured stone base	SW	20/01/2009
41	E Outlet Chamber with poured concrete base	SW	21/01/2009
42	Shot showing dumped blaze dam in section	NW	21/01/2009
43	E Outlet Chamber with poured concrete base	SW	21/01/2009
44	Demolition of rubble boundary wall at W Inlet Chamber	SE	21/01/2009
45	Section of rubble boundary wall at W Inlet Chamber	NE	21/01/2009
46	N Facing section of rubble boundary wall at W Inlet Chamber	N	21/01/2009
47	Beginning excavation for W Inlet Chamber	N	21/01/2009
48	Banked waterlogged silts at W Inlet Chamber	NE	21/01/2009
49	Rubble base for boundary wall at W Inlet Chamber	E	21/01/2009
50	Existing stream (to be diverted) to S of dig for W Inlet Chamber	N	21/01/2009
51	Digging new channel to divert stream	NW	21/01/2009
52	Shot of section of new stream channel	NE	21/01/2009
53	Shot of section of new stream channel	NE	21/01/2009
54	Releasing water into new stream channel	NW	21/01/2009
55	Part of an upright post for a lock gate found within S bank built up deposits	-	21/01/2009
56	Part of an upright post for a lock gate found within S bank built up deposits	-	21/01/2009
57	Part of an upright post for a lock gate found within S bank built up deposits	-	21/01/2009
58	Work in progress at W Inlet Chamber looking N	S	21/01/2009
59	Work in progress at W Inlet Chamber looking NNE	SSW	21/01/2009
60	Clay Subsoil at W Inlet Chamber	E	21/01/2009
61	Work in progress at W Inlet Chamber looking SW	NE	21/01/2009
62	Shot of S bank of Lock 17	E	21/01/2009
63	Shot of S bank of Lock 17	ENE	21/01/2009
64	Work in progress at W Inlet Chamber	N	21/01/2009
65	W Facing Section at E Outlet Chamber showing blaze dam over buried topsoil and clay subsoil	W	21/01/2009
66	Rubble base for boundary wall at W Inlet Chamber – W Facing Section	W	21/01/2009
67	Work in progress at W Inlet Chamber	SE	21/01/2009
68	Work in progress at W Inlet Chamber	E	21/01/2009
69	Stone Box and Cast Pipe to SE of excavation for W Inlet Chamber	NE	21/01/2009
70	Stone Box and Cast Pipe to SE of excavation for W Inlet Chamber	E	21/01/2009
71	Work in progress at W Inlet Chamber	SE	21/01/2009

Photo No.	Description	From	Date
72	Work in progress at W Inlet Chamber	SW	22/01/2009
73	View of Lock 17 from Allandale	SW	22/01/2009
74	Timber within canal dredgings at W Inlet Chamber	NE	22/01/2009
75	Timber within canal dredgings at W Inlet Chamber	NE	22/01/2009
76	Timber within canal dredgings at W Inlet Chamber	NE	22/01/2009
77	Timber within canal dredgings at W Inlet Chamber	NE	22/01/2009
78	W Facing Section of dig at W Inlet Chamber showing cast iron pipe	W	22/01/2009
79	W Facing Section of dig at W Inlet Chamber showing cast iron pipe	W	22/01/2009
80	Cast iron pipe running from Stone Box to SE of excavation for W Inlet Chamber	NE	22/01/2009
81	Work in progress at W Inlet Chamber	E	22/01/2009
82	Spreading stone at W Inlet Chamber	NNE	23/01/2009
83	E Facing Section of dig at W Inlet Chamber	E	23/01/2009
84	Work in progress at W Inlet Chamber	NE	23/01/2009
85	Marking out of W Inlet Chamber	W	23/01/2009
86	W Facing Section of dig at W Inlet Chamber	W	23/01/2009
87	SW wall of Lock 17 with rubble boundary wall to S	W	23/01/2009
88	Marking out of W Inlet Chamber – Moved S by 1m	SE	23/01/2009
89	Work in progress - E Facing Section of dig at W Inlet Chamber	SE	23/01/2009
90	E Facing Section of dig at W Inlet Chamber	E	23/01/2009
91	E Facing Section of dig at W Inlet Chamber	E	23/01/2009
92	Clay and Sand Subsoil at W Inlet Chamber	S	23/01/2009
93	Work in progress at W Inlet Chamber	E	23/01/2009
94	Work in progress at W Inlet Chamber	E	23/01/2009
95	E Facing Section of dig at W Inlet Chamber	E	23/01/2009
96	E Facing Section of dig at W Inlet Chamber	E	23/01/2009
97	Clear E Facing Section of dig at W Inlet Chamber	E	23/01/2009
98	Clear E Facing Section of dig at W Inlet Chamber	SE	23/01/2009
99	Clay and Sand Subsoil at W Inlet Chamber	-	23/01/2009
100	E Facing Section of dig at W Inlet Chamber	SE	23/01/2009
101	E Facing Section of dig at W Inlet Chamber	SE	23/01/2009
102	Post Ex Shot of Excavation for W Inlet Chamber looking NW	SE	26/01/2009
103	Looking NE at Pipe connecting to E Outlet Chamber and Excavation for Baffle Chamber	SW	10/02/2009
104	S Facing Section of Excavation for Baffle Chamber	S	10/02/2009
105	E Facing Section of Excavation for Baffle Chamber	E	10/02/2009
106	Looking ENE at Pipe connecting to E Outlet Chamber and Excavation for Baffle Chamber	WSW	10/02/2009
107	Looking SE at Pipe connecting to E Outlet Chamber and Excavation for Baffle Chamber	NW	10/02/2009
108	Looking NE at Pipe connecting to E Outlet Chamber and Excavation for Baffle Chamber	SW	10/02/2009
109	Looking NW at Concrete Pour for the W Inlet Chamber	SE	10/02/2009
110	Looking S at General Site of E Outlet Chamber and Cofferdam	N	10/02/2009
111	Looking S at Concrete Pour for the W Inlet Chamber	N	10/02/2009

Photo No.	Description	From	Date
112	Looking S at Concrete Pour for the W Inlet Chamber	N	10/02/2009
113	Looking NE at Metalwork for pouring the Baffle Chamber, with Pipe and E Outlet	SW	23/02/2009
114	Looking NNE at Metalwork for pouring the Baffle Chamber, with Pipe and E Outlet	SSW	23/02/2009
115	Looking W at removed grey brick hard stand with timber marker in foreground showing the run of the pipe track	E	23/02/2009
116	Looking S at the W Inlet Chamber	N	23/02/2009
117	Looking NW at the removal of the timber template for the pour of the W Inlet Chamber	SE	23/02/2009
118	Looking ENE at W Inlet Chamber before excavation of the pipe track between the chambers	WSW	23/02/2009
119	Looking S at the stream(diverted) running under the road	N	23/02/2009
120	Looking N at the W Inlet Chamber	S	23/02/2009
121	Looking SE at irregular masonry tied into the W Wall (S Side) of the Lock Chamber	NW	23/02/2009
122	Looking SW at the poured W Inlet Chamber	NE	23/02/2009
123	Looking W, Pre-Ex Shot of Pipe Track	E	23/02/2009
124	Looking E, Pre-Ex Shot of Pipe Track	W	23/02/2009
125	Looking NW at make up below Grey Brick Hardstand – Concrete with Sand on Top	SE	23/02/2009
126	Looking NE – Start of Excavation of W Side of Pipe Track	SW	23/02/2009
127	Looking NE – Start of Excavation of W Side of Pipe Track	SW	23/02/2009
128	Looking NE at Cast Iron Pipe with Clay above during Excavation of W Side of Pipe Track	SW	23/02/2009
129	Looking NE at Cast Iron Pipe with Clay above during Excavation of W Side of Pipe Track	SW	23/02/2009
130	Looking NE – Exposure of Top Section of a Wall during Excavation of W Side of Pipe Track	SW	23/02/2009
131	Looking E at Cast Iron Pipe with Clay above during Excavation of W Side of Pipe Track	W	23/02/2009
132	Looking NE – Clay and Pipe have fallen away to reveal a Wall behind during Excavation of W Side of Pipe Track	SW	23/02/2009
133	Looking E – Clay and Pipe have fallen away to reveal a Wall behind during Excavation of W Side of Pipe Track	W	23/02/2009
134	Looking E at Exposed Wall during Excavation of W Side of Pipe Track	W	23/02/2009
135	Looking NE at Exposed Wall during Excavation of W Side of Pipe Track	SW	23/02/2009
136	Looking NNE at Exposed Wall during Excavation of W Side of Pipe Track	SSW	23/02/2009
137	Looking SSE at Exposed Wall during Excavation of W Side of Pipe Track	NNW	23/02/2009
138	Cast Iron Pipes dug up during Excavation of W Side of Pipe Track	-	23/02/2009
139	Looking NE at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	23/02/2009
140	Looking NE at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	23/02/2009

Photo No.	Description	From	Date
141	Looking N at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	S	23/02/2009
142	Looking N at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	S	24/02/2009
143	Looking NE at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	24/02/2009
144	Looking E at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	W	24/02/2009
145	Looking NE at partial collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	24/02/2009
146	Looking NE at W Wall of the S Side of the Lock Chamber	SW	24/02/2009
147	Looking NE at further collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	24/02/2009
148	Arrival of Temporary Bridge	WSW	24/02/2009
149	Installation of Temporary Bridge	SW	24/02/2009
150	Installation of Temporary Bridge	SW	24/02/2009
151	Installation of Temporary Bridge	SW	24/02/2009
152	Installation of Temporary Bridge	SW	24/02/2009
153	Clearance of Collapsed Rubble looking NE	SW	24/02/2009
154	Looking ENE at section behind Collapsed Wall	WSW	24/02/2009
155	Looking ENE at section behind Collapsed Wall	WSW	24/02/2009
156	Looking ESE at section behind Collapsed Wall	WNW	24/02/2009
157	Looking E at remains of Collapsed Wall	W	24/02/2009
158	Looking E at Masonry of W Wall of the S Side of the Lock Chamber	W	24/02/2009
159	Looking ENE at Masonry of W Wall of the S Side of the Lock Chamber	WSW	24/02/2009
160	Looking NE at further collapse of Exposed Wall during Excavation of W Side of Pipe Track	SW	24/02/2009
161	Looking NNE at further collapse of Exposed Wall during Excavation of W Side of Pipe Track	SSW	24/02/2009
162	Looking NE at exposed section behind collapsed wall	SW	24/02/2009
163	Looking NE at pipe dog-legging ENE from the W Inlet Chamber	SW	24/02/2009
164	Working Shot looking N during Excavation of W Side of Pipe Track	S	24/02/2009
165	Working Shot looking N during Excavation of W Side of Pipe Track	S	24/02/2009
166	Working Shot looking N during Excavation of W Side of Pipe Track	S	24/02/2009
167	Working Shot looking NW during Excavation of W Side of Pipe Track	SE	24/02/2009
168	Working Shot looking NE during Excavation of W Side of Pipe Track	SW	24/02/2009
169	N Facing Section looking NW during Excavation of W Side of Pipe Track	SE	24/02/2009
170	Working Shot looking NW during Excavation of W Side of Pipe Track	SE	24/02/2009

Photo No.	Description	From	Date
171	Shot of N-Facing Section through Collapsed wall during Excavation of W Side of Pipe Track	S	24/02/2009
172	Working Shot looking NE during Excavation of W Side of Pipe Track	SW	25/02/2009
173	N Facing Section looking NNW during Excavation of W Side of Pipe Track	SSE	25/02/2009
174	Post Ex Shot of N-Facing Section of the first 3m Excavation of W Side of Pipe Track looking N	S	25/02/2009
175	Post Ex Shot of S-Facing Section of the first 3m Excavation of W Side of Pipe Track looking SSW (Timber in Section)	NNE	25/02/2009
176	Looking NE – taking levels within Safety Box during Excavation of W Side of Pipe Track	SW	25/02/2009
177	Working Shot of N-Facing Section of the second 3m Excavation of W Side of Pipe Track looking N	S	25/02/2009
178	Post Ex Shot of N-Facing Section of the second 3m Excavation of W Side of Pipe Track looking N	S	25/02/2009
179	Post Ex Shot of N-Facing Section of the second 3m Excavation of W Side of Pipe Track looking N	S	25/02/2009
180	Looking NE – Working Shot during Excavation of W Side of Pipe Track	SW	25/02/2009
181	Looking NE – Working Shot during Excavation of W Side of Pipe Track	SW	25/02/2009
182	Looking SE at S Facing Section of the second 3m Excavation of W Side of Pipe Track	NW	25/02/2009
183	Looking NNW at layers and timber in the N-Facing Section during Excavation of W Side of Pipe Track	SSE	25/02/2009
184	Looking NNW at layers and timber in the N-Facing Section during Excavation of W Side of Pipe Track	SSE	25/02/2009
185	Looking NNW at layers and timber in the N-Facing Section during Excavation of W Side of Pipe Track	SSE	25/02/2009
186	Looking NNW at layers and timber in the N-Facing Section during Excavation of W Side of Pipe Track	SSE	25/02/2009
187	Looking NW at the layers comprising the W portion of the N-Facing Section of the Pipe Track	SE	25/02/2009
188	Work In Progress Looking NE	SW	25/02/2009
189	Looking NE at third 3m excavation during Excavation of W Side of Pipe Track	SW	25/02/2009
190	Looking NE at first 3 laid sections of Pipe and Backfill	SW	26/02/2009
191	Looking NE at first 3 laid sections of Pipe and Backfill	SW	26/02/2009
192	Work In Progress Looking E	W	26/02/2009
193	Work In Progress Looking NE	SW	26/02/2009
194	Looking NW at N-Facing Section of W Side of Pipe Track (4th Excavation Cut from W)	SE	26/02/2009
195	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
196	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
197	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
198	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
199	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009

Photo No.	Description	From	Date
200	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
201	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
202	Record Shot of Old Lock Gate Timber from N Section	-	26/02/2009
203	Work In Progress Looking ENE	WSW	26/02/2009
204	Excavation of 4th Section from W looking NNE at N-Facing Section	SSW	26/02/2009
205	Excavation of 4th Section from W looking NNE at N-Facing Section	SSW	26/02/2009
206	Excavation of 4th Section from W looking NNE at N-Facing Section	SSW	26/02/2009
207	Excavation of 4th Section from W looking NW at N-Facing Section	SE	26/02/2009
208	General Shot of N-Facing Section	SE	26/02/2009
209	Excavation of 5th Section from W looking NE at N-Facing Section	SW	26/02/2009
210	Excavation of 5th Section from W looking NE at N-Facing Section	SW	26/02/2009
211	Detail Shot of layers in N-Facing Section	S	26/02/2009
212	Looking NE at Poured Concrete Baffle Chamber	SW	26/02/2009
213	Work in Progress Looking SE	NW	27/02/2009
214	Work in Progress Looking SW	NE	27/02/2009
215	Work in progress Looking NE – Gate Timber from Lock and Bush in Section	SW	27/02/2009
216	Work in Progress Looking NE	SW	27/02/2009
217	Work in Progress Looking SSE at S-Facing Section	NW	27/02/2009
218	Work in Progress Looking SSE at S-Facing Section	NW	27/02/2009
219	Work in Progress Looking NE with Safety Box	SW	27/02/2009
220	Working Shot – Looking W at W side of Pipe Track Progress	E	27/02/2009
221	Looking NE at E Outlet Chamber	SW	27/02/2009
222	Working Shot of Pipe Being Lowered into W Side of Pipe Track Excavation	SW	27/02/2009
223	Post-Ex Shot of the backfilled W Side of the Pipe Trench	E	27/02/2009
224	Pre-Ex Shot looking W at Baffle Chamber and Line of E Side of Pipe Track	E	27/02/2009
225	General Shot Looking NW of E Outlet and Baffle Chamber	SE	27/02/2009
226	Pre-Ex Shot looking W at Baffle Chamber and Line of E Side of Pipe Track	E	28/02/2009
227	Work in Progress looking WNW – N Facing Section at E side of Pipe Track	ESE	28/02/2009
228	Looking W at first Pipe laid	E	28/02/2009
229	Work in Progress looking WNW – N Facing Section at E side of Pipe Track (2nd Excavation)	ESE	28/02/2009
230	Record Shot of a piece of Lock Gate Furniture found in the E Pipe Track Excavation	-	28/02/2009
231	Record Shot of a piece of Lock Gate Furniture found in the E Pipe Track Excavation	-	28/02/2009
232	Record Shot of a piece of Lock Gate Furniture found in the E Pipe Track Excavation	-	28/02/2009

Photo No.	Description	From	Date
233	Record Shot of a piece of Lock Gate Furniture found in the E Pipe Track Excavation	-	28/02/2009
234	Third 3m Excavation from E – Sandstone within Fill, Looking NW	SE	28/02/2009
235	Breached Sandstone Field Drain in S Section in the E Pipe Track Excavation	NE	28/02/2009
236	Looking NNW at Breached Field Drain in N Section	SSE	28/02/2009
237	Looking NNW at Breached Field Drain in N Section	SSE	28/02/2009
238	Looking NNW at Breached Field Drain in N Section	SSE	28/02/2009
239	Looking N at Breached Field Drain in N Section	S	28/02/2009
240	Work in Progress E Pipe Track looking NNW	SSE	28/02/2009
241	Looking SW at Breached Field Drain in S Section	NE	28/02/2009
242	Work in Progress E Pipe Track looking NW	SE	28/02/2009
243	Work in Progress E Pipe Track looking WNW	ESE	28/02/2009
244	Looking SSW at Breached Field Drain and layers in S Section	NNE	28/02/2009
245	Looking SSW at Breached Field Drain and layers in S Section with Pipe in Place	NNE	28/02/2009
246	Looking NE at Backfilled E portion of the Pipe Track	SW	28/02/2009
247	Work in Progress Looking SW	NE	28/02/2009
248	Looking NW at next portion of the N-Facing Section	SE	28/02/2009
249	Layers of make up at NE angle of Car Park looking NW	SE	28/02/2009
250	Working Shot Looking WNW	ESE	28/02/2009
251	Work in Progress Looking W	E	01/03/2009
252	Work in Progress Looking NW	SE	01/03/2009
253	N-Facing Section looking NW	SE	01/03/2009
254	Looking W at broken Plastic Pipe running at Kerb Line	E	01/03/2009
255	Looking SW at broken Plastic Pipe running at Kerb Line	NE	01/03/2009
256	N-Facing Section looking NW	SE	01/03/2009
257	Looking W at next section of Pipe laid in the E portion of the Pipe Track	E	01/03/2009
258	Looking NE at next section of Pipe laid in the E portion of the Pipe Track	SW	01/03/2009
259	Next N-Facing Section looking NW	SE	01/03/2009
260	Looking NW at Bridge, Drain and Section at SE Side of the Lock Chamber	SE	02/03/2009
261	Work in Progress Looking W	E	02/03/2009
262	Next N-Facing Section looking NW	SE	02/03/2009
263	Next N-Facing Section looking NW	SE	02/03/2009
264	Looking S at Blue Water Pipe at Bridge	N	02/03/2009
265	Looking S at Blue Water Pipe at Bridge	N	02/03/2009
266	Looking SSE at Blue Water Pipe and Gravel Bedding at Bridge	NNW	02/03/2009
267	Looking NW at Waste Pipe and Water Pipe at Bridge	SE	02/03/2009
268	Looking SW at Waste Pipe and Water Pipe at Bridge	NE	02/03/2009
269	Work in Progress clearing Services Looking W	E	02/03/2009
270	Looking NW at exposed services – from Right – Water, Waste, BT and Gas	SE	02/03/2009
271	Work in Progress Looking WNW	ESE	02/03/2009
272	Looking NW at exposed services – from Right – Water, Waste,	SE	02/03/2009

Photo No.	Description	From	Date
	BT and Gas		
273	Looking NW at exposed services – from Right – Water, Waste, BT and Gas (hidden)	SE	03/03/2009
274	Looking N at exposed services – from Right – Water, Waste, BT and Gas in relation to the Bridge	S	03/03/2009
275	Looking S at Puddle Clay sealing the sides of the W Inlet Chamber	N	04/03/2009
276	General Shot of E Outlet Looking SSW	NNE	04/03/2009
277	Looking NE at N Section of next part of the W Side of the Pipe Track Excavation	SW	04/03/2009
278	Work in Progress with Safety Box looking E	W	04/03/2009
279	Looking S at Rip-Rap being laid over the Puddle Clay sealing the sides of the W Inlet Chamber	N	04/03/2009
280	General Shot Looking S of banked deposits at the E Outlet after removal of the sheet dam	N	04/03/2009
281	General Shot Looking S of banked deposits at the E Outlet after removal of the sheet dam	N	04/03/2009
282	General Shot Looking SW at Lock 17	NE	04/03/2009
283	Looking SSE at Rip-Rap covering the Puddle Clay sealing the sides of the W Inlet Chamber	NNW	05/03/2009
284	Looking NE at next part of the N Section of the W Side of the Pipe Track Excavation	SW	05/03/2009
285	Work in Progress, Pipe Laid Looking ENE	WSW	05/03/2009
286	Work in Progress, Type 1 over Pipe Looking ENE – Pipe sealed until join can be made with the E section of the Pipe	WSW	05/03/2009
287	Looking WNW, extending the E portion of the Pipe Track	ESE	05/03/2009
288	Looking NW at N-Facing Section of extension to E portion of the Pipe Track	SE	05/03/2009
289	Work in Progress Looking NW	SE	05/03/2009
290	Work in Progress Looking WNW	ESE	05/03/2009
291	Work in Progress Looking NW	SE	05/03/2009
292	Work in Progress Looking NW at N Section	SE	05/03/2009
293	Work in Progress Looking NW at N Section	SE	05/03/2009
294	Looking W as digger tries to find the W Section of Pipe	E	05/03/2009
295	Looking ESE at E portion of Pipe	WNW	05/03/2009
296	Looking SE at E portion of Pipe	NW	05/03/2009
297	Work in Progress Looking W	E	05/03/2009
298	Looking WNW at exposed E End of the W portion of Pipe	ESE	05/03/2009
299	General Shot Looking W	E	05/03/2009
300	Looking NW at exposed E End of the W portion of Pipe	SE	05/03/2009