

GUARD ARCHAEOLOGY



**The Helix Canal Connection, Falkirk,
Archaeological Watching Brief
Data Structure Report
Project 3618**

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The Helix Canal Connection, Falkirk, Archaeological Watching Brief Data Structure Report

On behalf of: The Helix Trust

NGR: NS 9053 8162

Project Number: 3618

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Approved by:



Date:

06/03/2013

*This document has been prepared in accordance
with GUARD Archaeology Limited standard operating procedures.*

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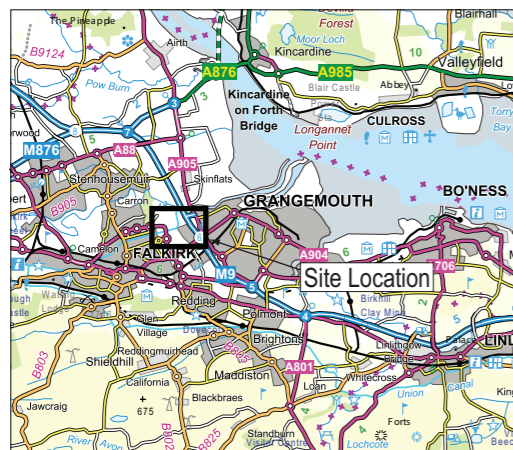
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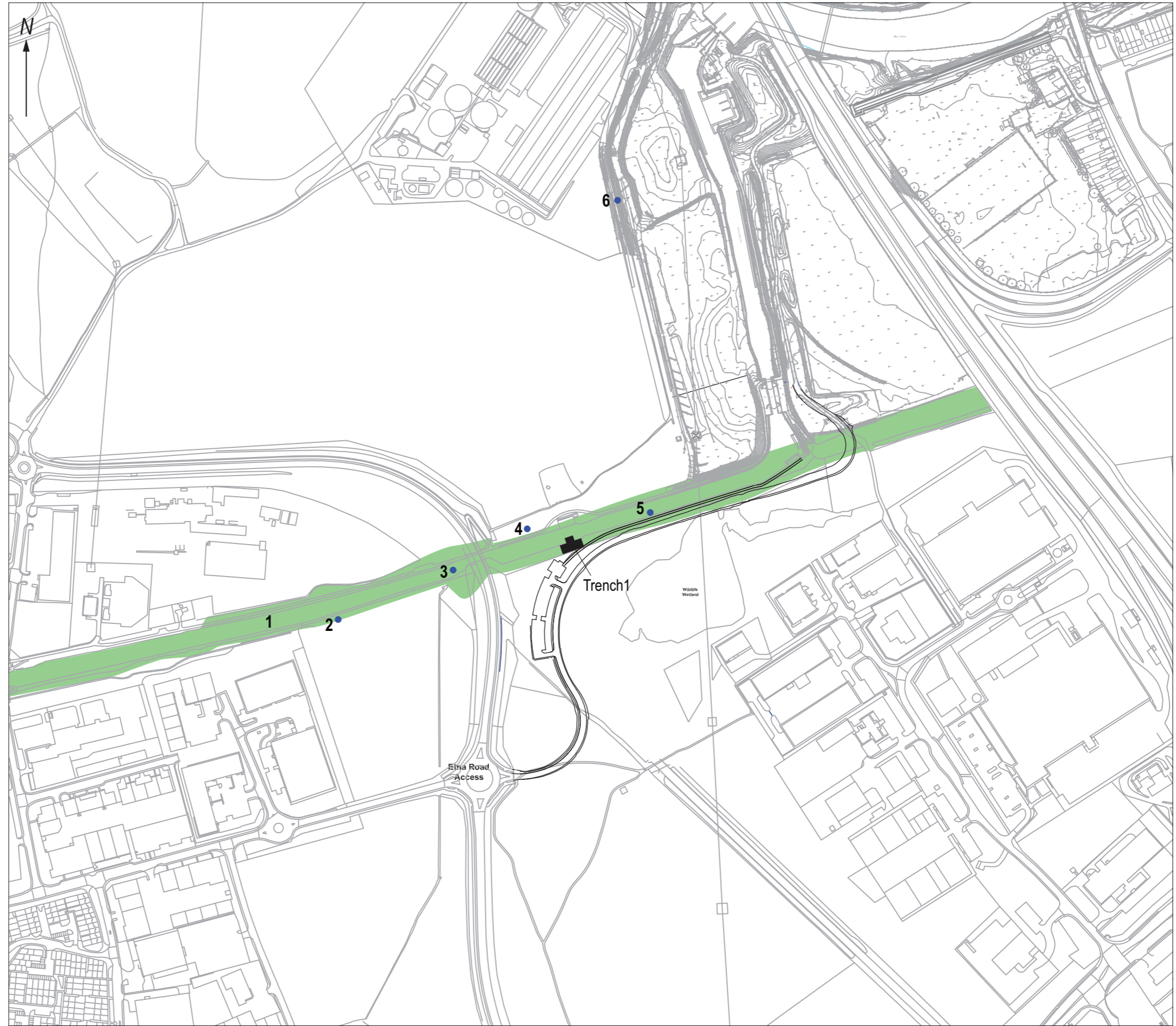


- Key**
- Access road
 - SAM site 1. Forth & Clyde Canal
 - NMRS sites
 - 2. Abbotshaugh Basin
 - 3. Dalderse Swing Bridge
 - 4. Ladysmill Burn Building
 - 5. Lock 3
 - 6. The Carron Cut



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Figure 1: Location of SAM area, NMRS sites & watching brief area



Executive Summary

- 1.1 GUARD Archaeology Limited were commissioned to undertake an archaeological watching brief during the construction works for the Helix Canal Connection with the Forth & Clyde Canal Scheduled Ancient Monument at Falkirk, Stirlingshire. This work was undertaken between 29th January and 22nd February 2013. The canal wall of the Forth & Clyde Canal at this juncture was clearly identifiable during this watching brief and was found to consist of timber pilings and heavily compacted grey clay, capped by large cap stones. The foundation trench was infilled with natural boulder clay. Subsurface deposits on the south bank of the canal have also evidently been disturbed previously by service trenches.

Introduction

- 2.1 This report sets out the results of an archaeological watching brief undertaken by GUARD Archaeology Limited, commissioned by Ironside Farrar acting on behalf of the Helix Trust, during construction works for the Helix Canal Connection within the Forth and Clyde Canal Scheduled Monument Area (SAM No 6768).

Site Location, Topography and Geology

- 3.1 The canal connection area lies within the eastern part of the Castlecary-M9 Motorway section of the Forth and Clyde Canal, located to the north of Falkirk and centred on NGR NS 9053 8162 (Figure 1). The precise area of groundworks subject to the archaeological watching brief is bounded to the north by the Forth and Clyde Canal, to the south and east by the Helix Canal access road and to the west by the A9.
- 3.2 The underlying superficial deposits consist of Raised Tidal Flat Deposits – silt and clay – of Flandrian Age, while the bedrock consists of Scottish Lower Coal Measures Formation of the Carboniferous Period (British Geological Survey 1982).

Archaeological Background

- 4.1 Examination of PASTMAP previously identified six sites of archaeological interest within the immediate environs of the development area (Figure 1). These sites include:
- Site 1: Forth and Clyde Canal (NS98SW 57; SAM No 6768) centred at NGR NS 9044 8159;
 - Site 2: Abbotshaugh Basin (NMRS NS98SW 39) centred at NGR NS 6590 5910;
 - Site 3: Dalderse Swing Bridge (NMRS NS98SW 38) centred at NGR NS 9029 8155;
 - Site 4: Ladysmill Burn Building (NMRS NS98SW 33) centred at NGR NS 9038 8160;
 - Site 5: Forth and Clyde Canal Lock 3 (NMRS NS98SW 40) centred at NGR NS 9053 8162;
 - Site 6: The Carron Cut (NMRS NS98SW 58) centred at NS 9049 8200.
- 4.2 Designed by John Smeaton, construction of the Forth and Clyde Canal (Site 1) was started in 1768 and completed in 1790. The Union Canal, designed by Hugh Baird, was subsequently constructed between 1818 and 1822 to link the eastern end of the canal to Edinburgh. Between 1789 and 1803 the Forth and Clyde Canal was used for steamboat trials and consequently became a major route for 'Clyde Puffers'.
- 4.3 In 1842 the Caledonian Railway Company was authorised by an Act of Parliament to take over the Forth and Clyde Canal, though this did not take effect until 1853. The canal was nationalised in 1948, along with the railway companies, and control passed to the British Transport Commission, and subsequently when this was wound up in 1962, passed to the British Waterway Board.
- 4.4 Originally used for transporting coal, competition from the railways caused it to close to commercial use in the 1930s. The locks, connecting it to the Union Canal at Falkirk, were filled

in and built over. In 1963 the canal was closed rather than construct a motorway crossing, and so it became disused and semi-derelict. The canal is now largely restored, however, for both recreational boating and for walkers and cyclists on the towpath. A variety of local community groups promote the general use of the canal. The Millennium Link, a project to restore both the Union and Forth and Clyde Canals, saw the two canals joined once again at the Falkirk end of the Union Canal, in the year 2000, by means of the Falkirk Wheel.

- 4.5 The canal within the immediate environs of the development area also contains a number of other features of cultural heritage interest. Lock 3 (Site 5), located a short distance to the east of the Dalderse Railway Swing Bridge (Site 3), led to the original access to the River Carron, which has been infilled. Formerly 'The Carron Cut' (Site 6) ran from this lock. It had been constructed by the Carron Company in order that canal traffic could gain more immediate access to the River Carron, where their works were situated. Although this obviated the necessity of passing through any more locks before the Forth it did involve as long a journey up the Carron River. This lock was clearly marked as Lock 3 on the first edition map of Stirlingshire (Ordnance Survey 1865).
- 4.6 One small unroofed building (Site 4), annotated as a ruin to the immediate north of the canal, is depicted on the first edition map of Stirlingshire (Ordnance Survey 1865).
- 4.7 Prior to the proposed Falkirk Gateway Development, an archaeological evaluation was undertaken at the site of a small basin (Site 2) on the south side of the canal, which appeared on the first edition map of Stirlingshire (Ordnance Survey 1865), but no significant archaeological remains were encountered.
- 4.8 GUARD Archaeology undertook an archaeological watching brief between November and December 2011 during an earlier phase of construction works for the Helix Canal Hub Access Road, within the same section of the Forth & Clyde Canal Scheduled Ancient Monument (centred at NS 905 816). This work revealed only made ground, modern service trenches and early modern artefacts.

Aims and Objectives

5.1 The aims of the watching brief were:

- to ensure that any surviving archaeological remains associated with the Forth and Clyde Canal, encountered during ground-breaking works required for the construction of the Helix Canal Connection, were recorded to an appropriate level in order to document any changes proposed to the Scheduled Monument and to retrieve as much artefactual material as possible;
- to ensure that no other archaeologically significant features within the Scheduled Monument Area of the Forth and Clyde Canal were disturbed during the movement of machine plant during the development works.

5.2 The objectives were therefore to:

- Prepare a photographic and written record of that part of the canal prior to the commencement of ground-breaking works;
- Supervise the erection of temporary fencing either side of the affected bank of the canal, prior to the commencement of ground-breaking works;
- Supervise the movement of heavy machine plant within the Scheduled Monument Area during the course of ground-breaking works;
- Conduct an archaeological watching brief during the ground-breaking works within and immediately outwith the Scheduled Monument Area to establish the presence or absence

of any archaeological remains, and their character, date and extent if surviving; determine the character, extent and significance of any archaeological deposits encountered; and excavate and salvage any information possible from any significant features encountered;

- On completion of all excavation works a report to data structure level and an accompanying post-excavation research design (PERD) and costing will be submitted for agreement with the client, if required. The PERD will also outline arrangements for final publication of the work.

Methodology

- 6.1 The Written Scheme of Investigation, outlining the following methodology, agreed in advance with Historic Scotland, is presented in Appendix F. The area of the scheduled monument area subject to ground-breaking works associated with the construction of the Helix Canal Connection was photographed and a brief written description made prior to the commencement of ground-breaking works. Any other archaeological features within the affected part of the Scheduled Ancient Monument were to be recorded, photographed and planned using conventional proforma sheets and a digital camera.
- 6.2 The Watching Brief Archaeologist was to supervise the erection of temporary fencing either side of the affected part of the Scheduled Ancient Monument by the Main Contractor, prior to the commencement of ground-breaking works, to ensure that the specific area of the Scheduled Ancient Monument subject to ground-breaking works was first defined and to further ensure that no disturbance was made by subsequent movement of machine plant during the works.
- 6.3 All movement of heavy machine plant within the Scheduled Monument Area was to be supervised by the Watching Brief Archaeologist to ensure that no disturbance is made during the course of the ground-breaking works, beyond the proposed limits of ground-breaking works necessary for the construction of the access road.
- 6.4 A watching brief was to be carried out during the ground-breaking works to ensure that no significant archaeological remains were disturbed, without first being recorded. The watching brief was to include the monitoring of all topsoil and/ or over-burden stripping operations by machine and excavation and recording of any feature encountered.
- 6.5 The number of watching brief archaeologists required during stripping operations was to be dependent on the number of machines employed at any one time (one watching brief archaeologist per machine). All machines used for topsoil stripping were to be fitted with a c. 1.6 m wide flat-bladed (toothless) ditching bucket.
- 6.6 The topsoil was to be removed in spits to the first archaeological horizon or, where none was found, to the required depth of groundworks. Any archaeological features encountered were to be cleaned by hand by the Watching Brief Archaeologist to determine the date of the deposits, their character and extent. This was to include recording any part of the canal face, such as original facing stones, revealed during the ground-breaking works, in order to produce a section drawing from the canal face, through the towpath to the edge of the Scheduled Monument Area. Such features were to be recorded by written description on *pro forma* recording sheets, by photograph and by measured drawing.
- 6.7 Suitable down time was to be provided to the Watching Brief Archaeologist in order to fully recover any archaeological evidence encountered on a site. If any archaeology encountered was sufficiently significant or complex to require more than one day to excavate and record, an on-site meeting was to be arranged as soon as possible between the GUARD Project Manager, the client's agent and the relevant Historic Scotland Inspector to agree appropriate mitigation measures to both minimise the impact of further works on the scheduled monument and minimise the impact of any archaeological works upon the schedule of the development works.
- 6.8 All archaeological finds were to be dealt with by the on-site Archaeologist. The general practice was to be bulk recovery of all artefacts by context.

- 6.9 All excavated feature fills and horizons were to be sampled, using bulk soil samples, for palaeo-environmental evidence. This might also include micromorphological sampling in order to address soil development at the site.
- 6.10 A representative section was to be recorded from the canal face, through the towpath to the edge of the Scheduled Monument Area, denoting depth of topsoil, any stratigraphy present and the nature of the soil. This information was to be logged in the day book together with a sketch drawn to scale and a photographic record of deposits.
- 6.11 In the event that human remains were encountered during the watching brief, the local police, the client and Historic Scotland were to be notified immediately and no further work would take place on site until agreement on how to proceed had been reached with all parties.

Results

- 7.1 GUARD Archaeology undertook this programme of work between 29 January and 22 February 2013. The detailed results are presented in Appendices B-D and Figure 1.
- 7.2 A total area of 28 m² consisting of a 3.5x3.5m manhole trench (Plate 1) and a 14.2m pipe trench 1m wide was stripped of topsoil, in January 2013, to reveal mixed light brownish orange and grey clay subsoil (Plate 2). Over the majority of the Trench 1, topsoil deposits were 0.25m in depth increasing to 0.8m in depth in the embankment. Much of the pipe trench lay out with the boundaries of the Scheduled Monument Area but was deemed sufficiently close to warrant archaeological observation.



Plate 1: Pre-excitation shot of the manhole trench showing the embankment to the right and the canal edge to the left. The new access road can be seen in the top right corner.

- 7.3 During the course of the watching brief, the canal wall was exposed and broken through, revealing the foundation cut and method of construction (Plate 2). This comprised a foundation cut (005) 0.66m wide running parallel to the canal and a depth of at least 0.9m – the cut was not fully excavated. Timber piles (004) coated with tar or bitumen were set into the cut and capped with two courses of sandstone cap stones (003) 0.3 to 0.5m square (Plates 3 & 4). The foundation cut was backfilled with a heavily compacted grey clay (006) containing sandstone blocks and rubble which acted as reinforcement and packing for the piles and canal wall. On the inside of the wall, lower than the capstones, grey clay similar to (006) is also packed.
- 7.4 During the watching brief a background scatter of modern artefacts were recovered from topsoil deposits across the area. This included ceramics of twentieth century date and glass, plastic, ceramic building material and metal of twentieth century origin. A complete brown glass bottle of 19th century date was recovered from within the fill of the foundation cut (006) which also contained rubble.

Discussion

- 8.1 The watching brief identified the deposits used for backfill following the construction of the canal as a mix of redeposited boulder clay (Plate 2). These are similar to the deposits containing nineteenth and twentieth century ceramics found under the embankment just east of this area of work in November and December 2011, during an earlier phase of the work (Thomson & Rennie 2012). No structural elements of the canal were observed during the excavation of the manhole trench. No artefacts related to the construction of the canal were uncovered and no evidence of contemporaneous use were identified. Evidence of later use was identified, mainly in the form of pottery although modern plastics were also visible. Modern disturbances include the insertion of three water pipes, one a cast iron mains supply and two smaller, more modern pipes. The cast iron pipe may be the same pipe as identified in test pit 1 of previous works to the east of this area in November 2011 (Thomson & Rennie 2012).



Plate 2: Post excavation view of manhole trench showing the east facing section prior to stepping out. An increase in disturbance is visible on the right side of the section, nearest the canal.

- 8.2 The canal wall was exposed to allow a pipe to access the canal. The foundation cut and canal wall were clearly identifiable and were found to consist of timber pilings and heavily compacted grey clay. The backfill of the foundation cut was the same grey clay contaminated with rubble such as broken bricks as well as general general rubbish including a complete brown glass bottle. Timber pilings which comprise the structural support for the wall (Plate 4) serve to date the construction of this section of the canal wall as 19th century in date, fitting well with the appearance of the bricks and the bottle.



Plate 3: East facing section of foundation cut showing the natural clay (002), cut (005) backfilled clay (006) and cap stones (003).



Plate 4: Grey packing clay excavated to partially expose tarred timber piles and cap stones. Shown in context, looking north over the canal.

Conclusions

- 9.1 The canal wall of the Forth & Clyde Canal at this juncture was clearly identifiable during this watching brief and was found to consist of timber pilings and heavily compacted grey clay, capped by large cap stones. The foundation trench was infilled with natural boulder clay. Subsurface deposits on the south bank of the canal have also evidently been disturbed previously by service trenches.
- 9.2 A summary of the results of the Watching Brief will be submitted to Discovery and Excavation in Scotland. A copy of the summary is included in Appendix E. The archive for the project, including a copy of the report, will be submitted to the National Monuments Record for Scotland within six months.
- 9.3 The online OASIS form at <http://ads.ahds.ac.uk/project/oasis/> (OASIS Reference: guardarc1-144574) will be completed within three months. Once the Data Structure Report has become a public document by submission or incorporation into the local Sites and Monuments Record, the Falkirk Museums Service will validate the OASIS form thus placing the information into the public domain on the OASIS website.
- 9.4 The laws relating to Treasure Trove and *Bona Vacantia* in Scotland apply to all finds where the original owner cannot be identified. This includes all material recovered during archaeological fieldwork. Accordingly, all assemblages recovered from archaeological fieldwork are claimed automatically by the Crown and must be reported to the Scottish Archaeological Finds Allocation Panel through its secretariat, the Treasure Trove Unit. In the event of the discovery of small finds, a filled-out copy of the form "Declaration of an Archaeological Assemblage from Fieldwork" and two copies of the pertinent Data Structure Report will be submitted to the Panel at the conclusion of the fieldwork. The Panel will then be responsible for recommending to the Queen's and Lord Treasurer's Remembrancer which museum should be allocated the finds. All artefacts will be temporarily stored by GUARD Archaeology until a decision has been made by the panel.

Acknowledgements

- 10.1 GUARD Archaeology would like to thank RJ McLeod and Ironside Farrar for their assistance during this work. Plant and drivers were supplied by RJ McLeod. Technical support was provided by Aileen Maule and John Keily. The watching brief was undertaken by Rowena Thomson and Christine Rennie. The illustrations were produced by Gillian McSwan. The report was desk top published by Gillian McSwan. The project was managed for GUARD Archaeology by Ronan Toolis.

**The Helix Canal Connection, Falkirk,
Archaeological Watching Brief.**

Section 2: Appendices



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Appendices

Appendix A: Bibliography

British Geological Survey 1982 *Geological Map of NS98SW; Bedrock and Superficial Deposits*.

Ordnance Survey 1865 *Stirlingshire sheet xxiv*. 6-inch map.

Thomson, R & Rennie C 2012 *The Helix Canal Hub Access Road, Falkirk, Archaeological Watching Brief*, unpublished GUARD Archaeology Data Structure Report, Project 3146.

Appendix B: List of Contexts

Context No.	Area	Description	Interpretation
001	-	Loosely compact mid brown silty loam with very frequent modern rubble inclusions – CBM, plastic and gravel. 0.25 – 0.8m	Topsoil – possibly imported
002	-	Moderately compact mixed grey and pale orange/brown boulder clay. 1.7m – 2m in depth. Some modern CBM contamination. 3 water pipes, one a cast iron mains pipe. Cut of service trenches not visible in topsoil	Clay subsoil of embankment. Possibly built up to increase the height of the embankment.
003	-	Two courses of unbonded sandstone blocks, 0.3 to 0.5m square, capping canal southern wall	Capping stones of the Forth and Clyde canal
004	-	Timber piles (railway sleeper size) on south side of the Forth and Clyde canal wall. Piles are coated with tar or bitumen and some show signs of considerable rotting.	Piles for Forth and Clyde canal, 19th century
005	-	Linear cut 0.66m wide. Length indeterminate (poss. Length of the canal). Full depth unknown, at least 0.9m. Not excavated. Filled by 006	Foundation cut for canal wall, 19th century
006	-	Heavily compacted grey clay with sandstone blocks and rubble. Over 0.9 m deep, fill of (005)	fill and packing of foundation cut for Forth and Clyde canal wall. 19th century.

Appendix C: List of Finds

Find No.	Area	Context No.	No. of Pieces	Material	Description
1	-	1	1	Glass	Brown bottle – poss. medicinal

Appendix D: List of Digital Photographs

File 001

Frame	Area	Context No.	Subject	Taken from
1	-	-	Area of manhole trench prior to work	S
2	-	-	Area of manhole trench prior to work	N
3	-	-	Area of manhole trench prior to work	w
4	-	001, 002	Working shot showing water pipe	w
5	-	001, 002	East facing section of manhole trench	E
6	-	001, 002	South facing section of manhole trench	S
7	-	001, 002	Working shot showing water pipe	w
8	-	001, 002	Working shot showing pipe trench	S
9	-	001, 002	Working shot showing pipe trench	S
10	-	001, 002	Working shot showing pipe trench	S
11	-	001, 002	West facing section of pipe trench	w

File 002

Frame	Area	Context No.	Subject	Taken from
1	-	-	ID shot	-
2	-	003,	Manhole in situ	S

Frame	Area	Context No.	Subject	Taken from
3	-	003,	Manhole and canal wall	S
4	-	003,	Canal wall	SE
5	-	003,	Canal wall	S
6	-	003,	Wall section in location context	S
7	-	-	Working shot – removing handrail	SW
8	-	-	Working shot – removing handrail	SW
9	-	-	Working shot – removing handrail	SW
10	-	-	Working shot – removing handrail	SW
11	-	003,	Wall during excavation	SW
12	-	-	Working shot	w
13	-	003, 004	Wall during excavation	SW
14	-	003, 004	Wall during excavation	SW
15	-	003 – 005	Wall and foundation cut after cleaning	S
16	-	003 - 005	Wall and foundation cut after cleaning	S
17	-	003, 004	Wall and timber piles	S
18	-	003, 004	Wall and timber piles – details	S
19	-	003, 004	Wall and timber piles – details	S
20	-	003,	Details of stone capping	S
21	-	003,	Details of stone capping	S
22	-	004,	Damage to timber pile	S
23	-	003, 004	Detail of canal wall	S
24	-	005, 006	East facing section of foundation cut	E
25	-	005, 006	East facing section of foundation cut	E
26	-	-	Working shot – marking cut of timber piles	SW
27	-	003, 004	Removing stones	SW
28	-	003, 004	Removing stones	SW
29	-	003, 004	Removing stones	SW
30	-	003, 004	Removing stones	SW
31	-	003, 004	Removing stones	SW
32	-	004,	Structural timbers	SW
33	-	004,	Cutting through timbers	SW
34	-	004,	Cutting through timbers	SW
35	-	004,	Cutting through timbers	SW
36	-	004,	Cutting through timbers	SW
37	-	004,	Cutting through timbers	SW
38	-	001, 002, 004	Area frozen and flooded	S
39	-	001, 002, 004	Area mostly drained with bedding and shuttering	S
40	-	001, 003	Timber and stones restored, concrete poured	S
41	-	001, 003	Section of cut after concrete poured	S

Appendix E: Discovery and Excavation Scotland Report

LOCAL AUTHORITY:	Falkirk
PROJECT TITLE/SITE NAME:	The Helix Canal Connection
PROJECT CODE:	3618
PARISH:	Grangemouth
NAME OF CONTRIBUTOR(S):	Rowena Thomson
NAME OF ORGANISATION:	GUARD Archaeology Ltd
TYPE(S) OF PROJECT:	Watching brief
NMRS NO(S):	NS98SW 57
SITE/MONUMENT TYPE(S):	Forth & Clyde Canal
SIGNIFICANT FINDS:	None
NGR (2 letters, 6 figures)	NS 905 816
START DATE (this season)	29 th January 2013
END DATE (this season)	22 nd February 2013
PREVIOUS WORK (incl. DES ref.)	Watching Brief (GUARD Archaeology 3146) DES 2012
MAIN (NARRATIVE) DESCRIPTION: (May include information from other fields)	GUARD Archaeology Ltd were commissioned to undertake an archaeological watching brief during the construction works for the Helix Canal Connection to the Forth & Clyde Canal Scheduled Ancient Monument Area between Falkirk and Grangemouth. The canal wall of the Forth & Clyde Canal at this juncture was clearly identifiable during this watching brief and was found to consist of timber pilings and heavily compacted grey clay, capped by large cap stones. The foundation trench was infilled with natural boulder clay. Subsurface deposits on the south bank of the canal have also evidently been disturbed previously by service trenches.
PROPOSED FUTURE WORK:	None
SPONSOR OR FUNDING BODY:	The Helix Trust
CAPTION(S) FOR ILLUSTRS:	--
ADDRESS OF MAIN CONTRIBUTOR:	GUARD Archaeology Limited, 52 Elderpark Workspace, 100 Elderpark Street, Glasgow, G51 3TR
EMAIL ADDRESS:	bob.will@guard-archaeology.co.uk
ARCHIVE LOCATION (intended/deposited)	The project archive will be deposited with the NMRS.

Appendix F: Written Scheme of Investigation

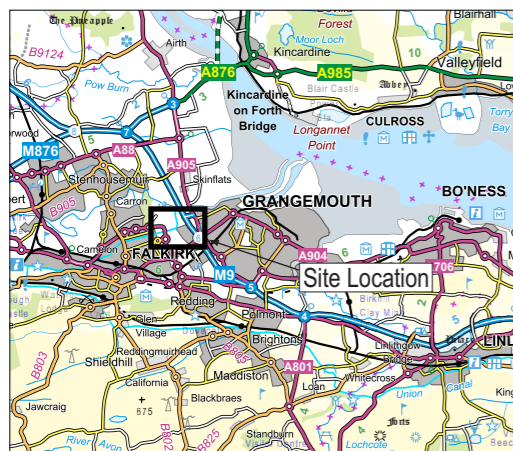
THE HELIX CANAL CONNECTION

WATCHING BRIEF WRITTEN SCHEME OF INVESTIGATION

PROJECT 3618

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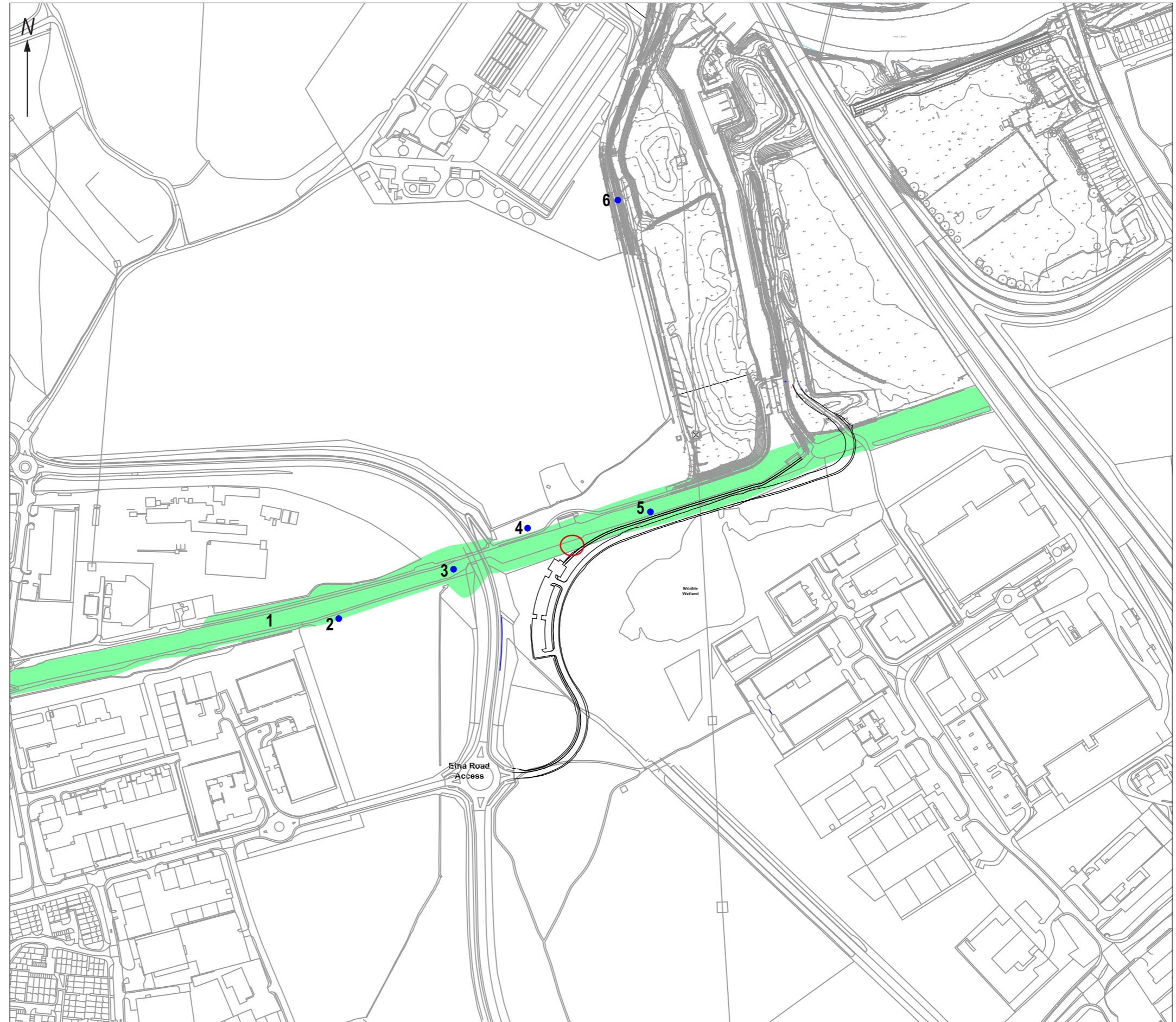


- Key**
- Watching brief area
 - Access road
 - SAM site 1. Forth & Clyde Canal
 - NMRS sites
- | | |
|--------------------------|----------------------------|
| 2. Abbotshaugh Basin | 4. Ladysmill Burn Building |
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Figure 1: Location of SAM area, NMRS sites & watching brief area



Introduction

- 1.1 This document sets out a Written Scheme of Investigation (WSI) for a phased programme of archaeological works associated with construction works for the Helix Canal Connection within the Forth and Clyde Canal Scheduled Monument Area (SAM No 6768).
- 1.2 The proposed groundworks will comprise the construction of an inlet chamber and pipework to the canal towpath/embankment to facilitate water extraction from the canal providing supplementary water to Helix lagoon. The chamber is effectively a manhole with a lid at existing ground level ensuring no change to existing embankment profile.
- 1.3 In the first instance, a watching brief during all proposed groundworks within the Scheduled Monument Area will be undertaken to establish whether any significant archaeological remains will be impacted by the groundworks associated with the Helix Canal Connection. Should significant remains be identified and it is not possible to preserve them *in situ* a further requirement for archaeological works to ensure their preservation through record is likely to be pursued.
- 1.4 This WSI outlines the entirety of the programme of archaeological works that may be needed to mitigate the effects of the proposed development. It details the methodology to be employed in implementing the Stage 1 archaeological works. The mitigation methodology to be employed during Stage 2 excavation and Stage 3 post excavation analysis and publication, will be specified in *addenda* to this document. These *addenda*, if required, will be submitted for agreement of Historic Scotland, prior to the commencement of any archaeological work. All phases of work will be funded by the developer.

Site Location and Cultural Significance of the Monument

- 1.1 The canal connection area lies within the eastern part of the Castlecary-M9 Motorway section of the Forth and Clyde Canal, located to the north of Falkirk and centered on NGR NS 9053 8162 (Figure 1). The precise area of groundworks subject to the archaeological watching brief is bounded to the north by the Forth and Clyde Canal, to the south and east by the Helix Canal access road and to the west by the A9.
- 1.2 Examination of PASTMAP has identified six sites of archaeological interest within the immediate environs of the development area (Figure 1). These sites include:
 - Site 1: Forth and Clyde Canal (NS98SW 57; SAM No 6768) centred at NGR NS 9044 8159;
 - Site 2: Abbotshaugh Basin (NMRS NS98SW 39) centred at NGR NS 6590 5910;
 - Site 3: Dalderse Swing Bridge (NMRS NS98SW 38) centred at NGR NS 9029 8155;
 - Site 4: Ladysmill Burn Building (NMRS NS98SW 33) centred at NGR NS 9038 8160;
 - Site 5: Forth and Clyde Canal Lock 3 (NMRS NS98SW 40) centred at NGR NS 9053 8162;
 - Site 6: The Carron Cut (NMRS NS98SW 58) centred at NS 9049 8200.
- 1.3 Designed by John Smeaton, construction of the Forth and Clyde Canal (Site 1) was started in 1768 and completed in 1790. The Union Canal, designed by Hugh Baird, was subsequently constructed between 1818 and 1822 to link the eastern end of the canal to Edinburgh. Between 1789 and 1803 the Forth and Clyde Canal was used for steamboat trials and consequently became a major route for 'Clyde Puffers'.
- 1.4 In 1842 the Caledonian Railway Company was authorised by an Act of Parliament to take over the Forth and Clyde Canal, though this did not take effect until 1853. The canal was nationalised in 1948, along with the railway companies, and control passed to the British Transport Commission, and subsequently when this was wound up in 1962, passed to the British Waterway Board.
- 1.5 Originally used for transporting coal, competition from the railways caused it to close to commercial use in the 1930s. The locks, connecting it to the Union Canal at Falkirk, were filled in and built over. In 1963 the canal was closed rather than construct a motorway crossing, and so it became disused and semi-derelict. The canal is now largely restored, however, for both recreational boating and for

walkers and cyclists on the towpath. A variety of local community groups promote the general use of the canal. The Millennium Link, a project to restore both the Union and Forth and Clyde Canals, saw the two canals joined once again at the Falkirk end of the Union Canal, in the year 2000, by means of the Falkirk Wheel.

- 1.6 The canal within the immediate environs of the development area also contains a number of other features of cultural heritage interest.
- 2.7 Lock 3 (Site 5), located a short distance to the east of the Dalderse Railway Swing Bridge (Site 3), led to the original access to the River Carron, which has been infilled. Formerly 'The Carron Cut' (Site 6) ran from this lock. It had been constructed by the Carron Company in order that canal traffic could gain more immediate access to the River Carron, where their works were situated. Although this obviated the necessity of passing through any more locks before the Forth it did involve as long a journey up the Carron River. This lock was clearly marked as Lock 3 on the first edition of the Ordnance Survey 6-inch map (Stirlingshire 1865, sheet xxiv).
- 2.8 One small unroofed building (Site 4), annotated as a ruin to the immediate north of the canal, is depicted on the first edition of the Ordnance Survey 6-inch map (Stirlingshire 1865, sheet xxiv).
- 2.9 Prior to the proposed Falkirk Gateway Development, an archaeological evaluation was undertaken at the site of a small basin (Site 2) on the south side of the canal, which appeared on the first edition of the Ordnance Survey 6-inch map (Stirlingshire 1865, sheet xxiv), but no significant archaeological remains were encountered.
- 2.10 GUARD Archaeology undertook an archaeological watching brief between November and December 2011 during an earlier phase of construction works for the Helix Canal Hub Access Road, within the same section of the Forth & Clyde Canal Scheduled Ancient Monument (centred at NS 905 816). This work revealed only made ground, modern service trenches and early modern artefacts.

Planning Background

- 3.1 This WSI has been drafted in response to Condition 1 of Scheduled Monument Consent set by Historic Scotland, requiring a Written Scheme of Investigation for an archaeological watching brief to ensure that archaeological information, impacted by the proposed groundworks, is recovered and recorded to a satisfactory standard.

Aims and Objectives

- 4.1 The aim of this mitigation strategy is:
 - to ensure that any surviving archaeological remains associated with the Forth and Clyde Canal, encountered during ground-breaking works required for the construction of the Helix Canal Connection, are recorded to an appropriate level in order to document any changes proposed to the Scheduled Monument and to retrieve as much artefactual material as possible;
 - to ensure that no other archaeologically significant features within the Scheduled Monument Area of the Forth and Clyde Canal are disturbed during the movement of machine plant during the development works.
- 4.2 The objectives are therefore to:
 - Prepare a photographic and written record of that part of the canal prior to the commencement of ground-breaking works;
 - Supervise the erection of temporary fencing either side of the affected bank of the canal, prior to the commencement of ground-breaking works;
 - Supervise the movement of heavy machine plant within the Scheduled Monument Area during the course of ground-breaking works;
 - Conduct an archaeological watching brief during the ground-breaking works within and immediately outwith the Scheduled Monument Area to establish the presence or absence of any archaeological remains, and their character, date and extent if surviving; determine the

character, extent and significance of any archaeological deposits encountered; and excavate and salvage any information possible from any significant features encountered;

- On completion of all excavation works a report to data structure level and an accompanying post-excavation research design (PERD) and costing will be submitted for agreement with the client, if required. The PERD will also outline arrangements for final publication of the work.

Methodology

- 5.1 The area of the scheduled monument area subject to ground-breaking works associated with the construction of the Helix Canal Connection will be photographed and a brief written description made prior to the commencement of ground-breaking works. Any other archaeological features within the affected part of the Scheduled Ancient Monument will be recorded, photographed and planned using conventional proforma sheets and a digital camera.
- 1.1 The Watching Brief Archaeologist will supervise the erection of temporary fencing either side of the affected part of the Scheduled Ancient Monument by the Main Contractor, prior to the commencement of ground-breaking works, to ensure that the specific area of the Scheduled Ancient Monument subject to ground-breaking works is first defined and to further ensure that no disturbance is made by subsequent movement of machine plant during the works.
- 1.2 All movement of heavy machine plant within the Scheduled Monument Area will be supervised by the Watching Brief Archaeologist to ensure that no disturbance is made during the course of the ground-breaking works, beyond the proposed limits of ground-breaking works necessary for the canal connection.
- 5.2 A watching brief will be carried out during the ground-breaking works to ensure that no significant archaeological remains are disturbed, without first being recorded. The watching brief will include the monitoring of all topsoil and/or over-burden stripping operations by machine and excavation and recording of any feature encountered.
- 1.4 The number of watching brief archaeologists required during stripping operations will be dependent upon the number of machines employed at any one time (one watching brief archaeologist per machine). All machines used for topsoil stripping will be fitted with a c 1.6 m wide flat-bladed (toothless) ditching bucket.
- 1.5 The topsoil will be removed in spits to the first archaeological horizon or, where none was found, to the required depth of groundworks. Any archaeological features encountered will be cleaned by hand by the Watching Brief Archaeologist to determine the date of the deposits, their character and extent. This will include recording any part of the canal face, such as original facing stones, revealed during the ground-breaking works, in order to produce a section drawing from the canal face, through the towpath to the edge of the Scheduled Monument Area. Such features will be recorded by written description on *pro forma* recording sheets, by photograph and by measured drawing.
- 1.6 Suitable down time will be provided to the Watching Brief Archaeologist in order to fully recover any archaeological evidence encountered on a site. If any archaeology encountered is sufficiently significant or complex to require more than one day to excavate and record, an on-site meeting would be arranged as soon as possible between the GUARD Project Manager, the client's agent and the relevant Historic Scotland Case Officer to agree appropriate mitigation measures to both minimise the impact of further works on the scheduled monument and minimise the impact of any archaeological works upon the schedule of the development works.
- 1.7 All archaeological finds will be dealt with by the on-site Archaeologist. The general practice will be to bulk recover all artefacts by context.
- 1.8 All hand-excavated feature fills and horizons will be sampled, using bulk soil samples, for palaeo-environmental evidence. This may also include micromorphological sampling in order to address soil development at the site.
- 1.9 A representative section will be recorded from the canal face, through the towpath to the edge of the Scheduled Monument Area, denoting depth of topsoil, any stratigraphy present and the nature

of the soil. This information will be logged in the day book together with a sketch drawn to scale and a photographic record of deposits.

- 1.10 In the event that human remains are encountered during the watching brief, the local police, the client and Historic Scotland will be notified immediately and no further work will take place on site until agreement on how to proceed has been reached with all parties.

Reporting

- 6.1 On completion of the watching brief phase of work, a report suitable for submission to Historic Scotland and the Falkirk Council Keeper of Archaeology and Local History will be produced. This report, detailing the results of the fieldwork, will be submitted to the client within four weeks of completion of fieldwork and, subject to client approval, submitted to Historic Scotland and the Falkirk Council Keeper of Archaeology within six weeks of the completion of fieldwork. The report will take the form of a Data Structure Report as specified by Historic Scotland and will contain an interim analysis of the results of the watching brief. The report will include a full descriptive text that will characterise the date and extent of any archaeological deposits. It will also include plans at an appropriate scale showing the area subjected to ground-breaking works and archiving lists of all finds, samples, field drawings and photographs.
- 6.2 Subject to the watching brief encountering significant archaeology, the report will be accompanied by a costed PERD for material recovered during the watching brief, in order to bring the results forward for analysis and publication should this be required.
- 6.3 GUARD will also implement the standards and requirements of the Archaeological Standard Protocol for the Integrated Reporting of Events (ASPIRE), Online Access to the Index of Archaeological Investigations (OASIS) and *Discovery and Excavation in Scotland*. In the event of minor archaeological remains being encountered during the watching brief, it is proposed that a comprehensive report submitted to *Discovery and Excavation Scotland*, will form the final publication of the archaeological results of this work.

Archiving

- 7.1 The resultant site archive will be deposited with the National Monuments Records for Scotland within six months of the completion of all work.
- 7.2 The laws relating to Treasure Trove and *Bona Vacantia* in Scotland apply to all finds where the original owner cannot be identified. This includes all material recovered during archaeological fieldwork. Accordingly, all assemblages recovered from archaeological fieldwork are claimed automatically by the Crown and must be reported to the Scottish Archaeological Finds Allocation Panel through its secretariat, the Treasure Trove Unit. In the event of the discovery of small finds, a filled-out copy of the form "Declaration of an Archaeological Assemblage from Fieldwork" and two copies of the pertinent Data Structure Report will be submitted to the Panel at the conclusion of the fieldwork. The Panel will then be responsible for recommending to the Queen's and Lord Treasurer's Remembrancer which museum should be allocated the finds. All artefacts will be temporarily stored by GUARD Archaeology until a decision has been made by the panel.

Timetable, Staffing and Monitoring

- 8.1 The proposed dates for the watching brief comprise Tuesday 29 January -Thursday 31 January 2013. This timetable has been notified to the relevant Historic Scotland Case Officer and the Falkirk Council Keeper of Archaeology prior to work beginning on site.
- 8.2 All GUARD Archaeology field staff will be qualified and suitably experienced professional archaeologists and CVs will be supplied if required. The project will be managed for GUARD Archaeology by Mr Ronan Toolis, who will be the main point of contact for the archaeological works.
- 8.3 The relevant Historic Scotland Case Officer and the Falkirk Council Keeper of Archaeology will be informed of the site mobile phone number prior to the start date so that monitoring visits can be arranged.

Health & Safety and Insurance

- 9.1 GUARD Archaeology will conduct the archaeological works in accordance with Health and Safety legislation and with the guidelines and standards governing archaeological fieldwork set down by the Institute for Archaeologists. Prior to fieldwork commencing a risk assessment of the project will be undertaken, giving rise to a project-specific safety plan. GUARD Archaeology also possess all necessary insurance cover, including employer's and public liability insurance cover, proofs of which will be supplied upon request.

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