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Holyhead Water Treatment Works and Associated Pipeline Improvements

Urban Scheme

Archaeological Mitigation

GAT Project No. 1750

Report No. 574

March 2005

Ymddiriedolaeth Archaeolegol Gwynedd
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Prepared for Galliford Try

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By

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HOLYHEAD WATER TREATMENT WORKS AND ASSOCIATED PIPELINE IMPROVEMENTS

URBAN SCHEME

ARCHAEOLOGICAL MITIGATION (G1750)

SUMMARY

Excavation on the site of the tramway to Salt Island revealed a section of the tramway in good condition with stone blocks still in situ. A section was recorded across a redundant section of Telford's London to Holyhead road, that revealed a method of construction very similar to that described by Telford. No other archaeological features of significance were noted during the watching brief.

INTRODUCTION

A new waste water treatment works has been constructed at Penrhos, Holyhead. In order to serve the new works, a series of existing pipelines were upgraded, and a new effluent discharge pipeline was constructed. The pipeline improvements were divided into three schemes: final effluent, urban and villages. This report contains the results of archaeological mitigation work, consisting of a watching brief, undertaken during the upgrading of the urban pipeline. The work was commissioned by Galliford Try, and undertaken by Gwynedd Archaeological Trust. The work was monitored for Welsh Water by Gwynedd Archaeological Planning Service.

ASSESSMENT AND EVALUATION

An archaeological assessment of the route was undertaken in October 2002 (GAT Report No. 464), and updated in February 2003 (GAT Report No. 464b), to take into account minor variations in the route and the results of a programme of field evaluation. In March 2004 an evaluation excavation was undertaken to locate the line of a former broad gauge tramway of mid-19th century date, thought to underlie the site of the proposed pumping station at Hibernia Row (see GAT Report No. 520). The evaluation was successful in locating the tramway, and full excavation was undertaken as part of the mitigation works.

RESULTS OF THE WATCHING BRIEF

Introduction

The route of the pipeline lies between the Penrhos Waste Water Treatment Works (SH25938135) and Holyhead Harbour (SH23618361).

The watching brief was undertaken intermittently from April 2004 through to January 2005. Excavation was undertaken at Hibernia Row to examine the broad gauge tramway, and a comprehensive watching brief was undertaken where the pipeline crossed Telford's London to Holyhead road.

The feature numbers below refer to the features identified during the archaeological assessment, and described in GAT Report No. 464a.

Feature 1 Porth y Felin House and Garden, Holyhead (PRN 18047) SH2375 8335,
Feature 2 Trinity Stores and workshops (PRN 18133) SH2410 8336 and
Feature 4 Marine Yard (PRN 18144) SH2490 8270,
No impact.

Feature 3 Tramway to Salt Island (PRN 18111) SH2490 8302
See figures 4 and 5 and plate 1

Background
A broad gauge tramway was built in 1848 to carry stone from quarries at the base of Holyhead mountain in order to construct a proposed breakwater off the north end of Salt Island. This formed part of a larger programme of works proposed by the engineer James Meadows Rendel for the construction of a harbour of refuge at Holyhead. This new larger outer harbour was to supplement the inner harbour which was used by the Irish mail steamers. The proposals consisted of two breakwaters, a large curving one off Soldiers Point to the west, and a smaller one off Salt Island on the east. Within the interior was to be a new packet pier, linked to the Chester and Holyhead Railway.

Messrs Rigby were appointed contractors to undertake the work, and George Dobson was appointed resident engineer. The initial year was spent carrying out improvements to the inner harbour, and constructing a tramway from the site of the proposed quarries at Holyhead Mountain to the two breakwaters. Two small branch lines were established off the Salt Island tramway, one to the proposed mail pier and the other to a creosote works and saw mill. The tramway was to the broad gauge (7' ¼"), a gauge well known to Rigby's from their work on the London to Bristol line designed by Brunel. It also provided the additional stability for the massive stones being carried, and was the gauge used by Rendel on his other schemes. The resident engineer Dobson designed wagons capable of carrying 8 to 10 tons of stone, and tipping directly into the sea through the gaps in the staging.

Construction of the two breakwaters was started in 1849. The timber staging was constructed, on the principal western breakwater off Soldiers Point this was 150ft wide, on which ran five separate lines 20ft above high water. Some 250 wagons were employed, tipping an average of 4,000 tons of stone a day. Locomotives were used on the staging, though horses were used on the line to and from the quarry. A similar method was used for the construction of the breakwater off Salt Island, though within a year work had because of dangerous working conditions, with the intention of continuing it when the north breakwater was long enough to offer protection. It was never restarted, and in 1856 the decision was taken to abandon the east breakwater and the proposed mail pier. The rails were lifted shortly after, and certainly by 1889, when the OS map was compiled. This shows the line of the bed of the tramway, but not the rails nor the timber staging that would have carried the tramway across to Salt Island.

Excavations
The excavations were undertaken in April 2004 by George Smith and Andrew Davidson of the Gwynedd Archaeological Trust. An area 18m by 6m (this was the location for the proposed pumping station) was stripped by a mechanical excavator. The topsoil (averaging 100mm thick) was removed onto the bed of the tramway, and the area subsequently cleaned by hand. This revealed the uppermost surface of the tramway bed. Further cleaning revealed the tops of the stone blocks. Following area excavation the features were planned, and each of the blocks were numbered. A trench was excavated through the tramway by mechanical excavator, and the section cleaned and recorded. The blocks were then lifted, and carried to the maritime museum, where they are to be stored.

The excavations revealed that the first stage of construction had involved digging a trench approximately 400mm deep and 4200mm wide. Within this trench were laid the stone blocks within a matrix of rough broken stones (100mm to 200mm in size) and dark silty soil. The top of the stony matrix formed the track bed in between the stone blocks, and this lay slightly above the top of the stone blocks, which lay some 300mm above the base of the trench. On the outside edge of the blocks the stones had been chosen and laid more carefully, in places as vertical slabs to form a revetment wall 400mm high. The outer stone revetments were built to reach a height some 100mm above the level of the top of the stone blocks, and therefore closer in height to the top of the rails.

The stone blocks differed slightly in size, but were approximately 600mm square and 300mm deep. The blocks were laid diagonally to the rails, not square, with their corners nearly touching each other along the line of the rails, though usually separated by 100mm to 200mm. Within the top of each block was a rectangular depression approximately 260mm by 120mm (10¼" by 4¾"), designed to take the rail chair. The distance between the chairs along the line varies between 800mm and 1000mm. The distance across the bed from the closest edge of the plates was 1960mm (6ft 6in), whereas the distance

from the centre of the nearest holes was 2100mm (7ft), approximating to a gauge of 7ft ¼in if it was measured from inside edge to inside edge of the rail.

Feature 5 Sewer culvert (PRN 18126)
Health and safety regulations prevented access to view this feature. GAT were informed that there had been no impact upon it.

Feature 6 Turkeyshore Road SH2524 8257
No new information was gained concerning the date or construction of this road. In order to minimise impact upon traffic the trench was dug and backfilled rapidly. There was no archaeological supervision.

Feature 7 Accumulator House (PRN 18079) SH2522 8256 and
Feature 8 Graving Dock (PRN 18078) SH2521 8259
No impact.

Feature 9 Tyddyn Lantern (PRN 18129) SH2533 8252
The pipeline did not impact upon any remains associated with the former house and buildings at Tyddyn Lantern. This was because the route lay just outside the site of the buildings.

Feature 10 Graving Dock (PRN 18012) SH2549 8220 and
Feature 11 Engine House (PRN 18013) SH2546 8251
No impact.

Feature 12 Llain Garregoes SH2547 8244
No features were noted in the vicinity of Llain Garregoes. It is thought this was because the route of the pipeline lay outside the site of the former building.

Feature 13 Ellin Stanley's Cross SH2552 8202 and
Feature 14 Rectangular structure SH2583 8204
No impact.

Feature 15 Telford's Holyhead road SH2594 8137
See figure 3 for illustration of section.
The pipeline cut through a redundant section of Telford's London to Holyhead road. This short length of road is situated off the approach way to Anglesey Aluminium, and was replaced by the existing A5 road following the construction of Anglesey Aluminium in the late 1960's. It is now used as a parking area for lorries. This section of the road was constructed sometime after 1823. The construction of the road was found to be consistent with Telford's design plans for the London to Holyhead road.

The section revealed a layer of stones laid on edge, varying between 150mm and 180mm in height, resting on a loamy clay with some stone inclusions, and below that again the glacial clay till. Above the platform of edge stones was a convex layer of grey small compacted stone approximately 80mm thick at the centre of the road. This is thought to represent the surface of Telford's road. The modern tarmac lay directly on this layer. The structure was cut through on both sides by trenches dug to take electricity and gas conduits. These effectively destroyed the evidence on both sides, and part of the surface on the north side.

The method of construction closely resembles that described by Telford and illustrated in his Atlas (reproduced in Quartermaine, Trinder and Turner 2003, Thomas Telford's Holyhead Road, fig 4.2).

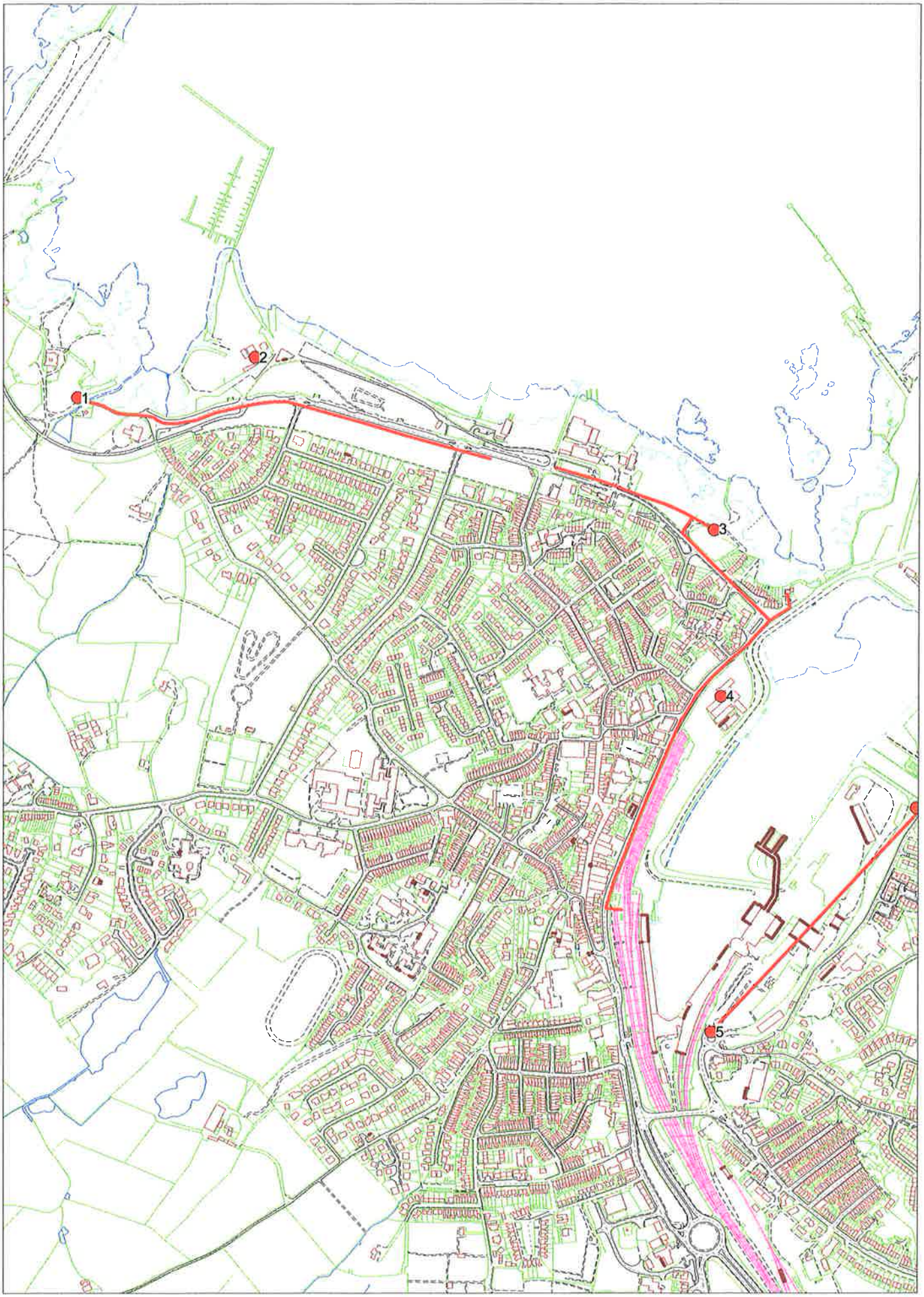

Figure 1: Location of sites on western part of route. Scale: 1:8,000

Figure 2: Location of sites on eastern part of route. Scale: 1:8,000

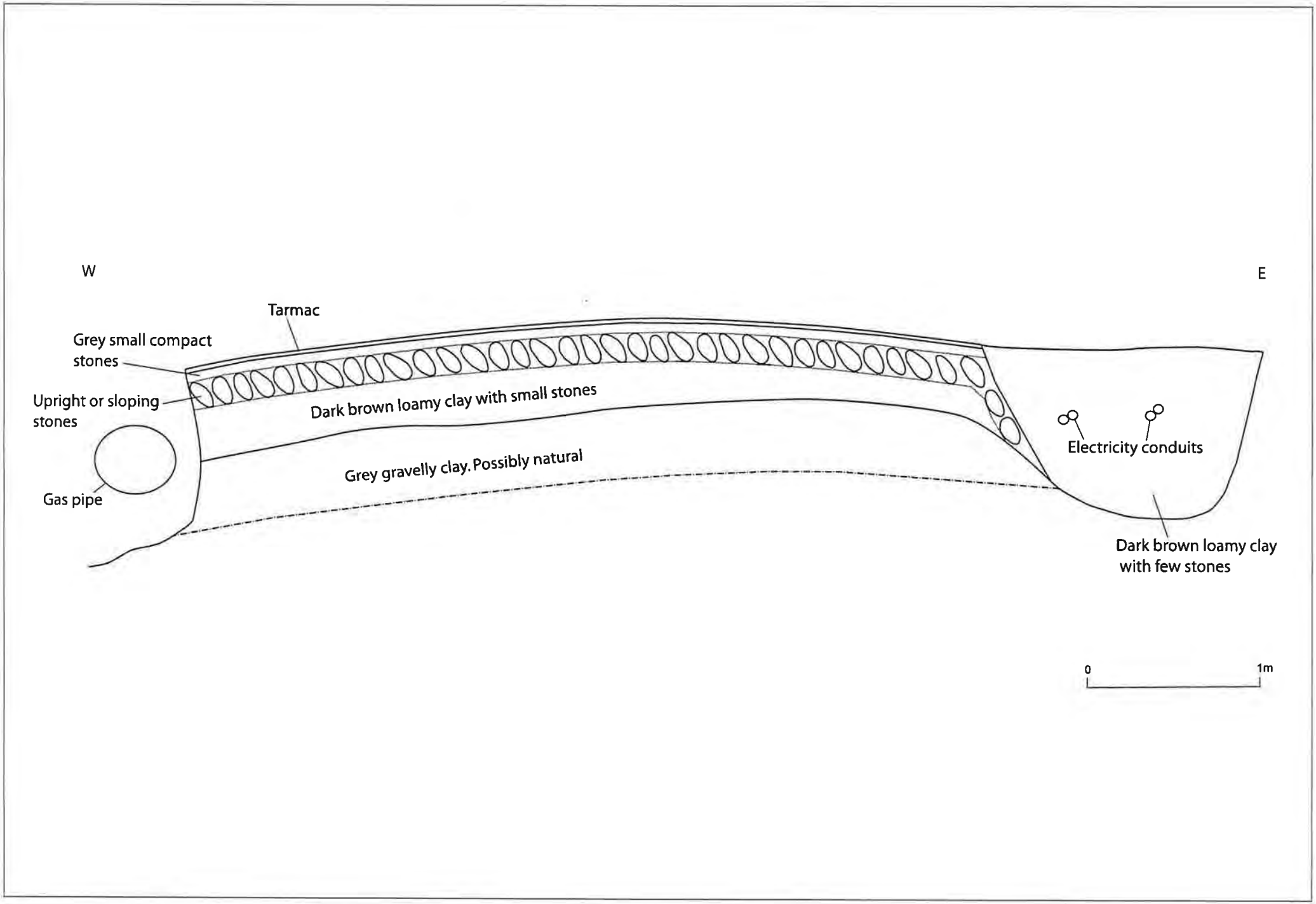

Figure 3. Diagramatic section across site 15 (south facing).

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Figure 5. South facing section across tramway

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Extent of excavation
Section line
Limit of Excavation
Timbers
Sub-Angular Stone spread
Stone structure

Figure 4. Plan of Tramway (feature3).

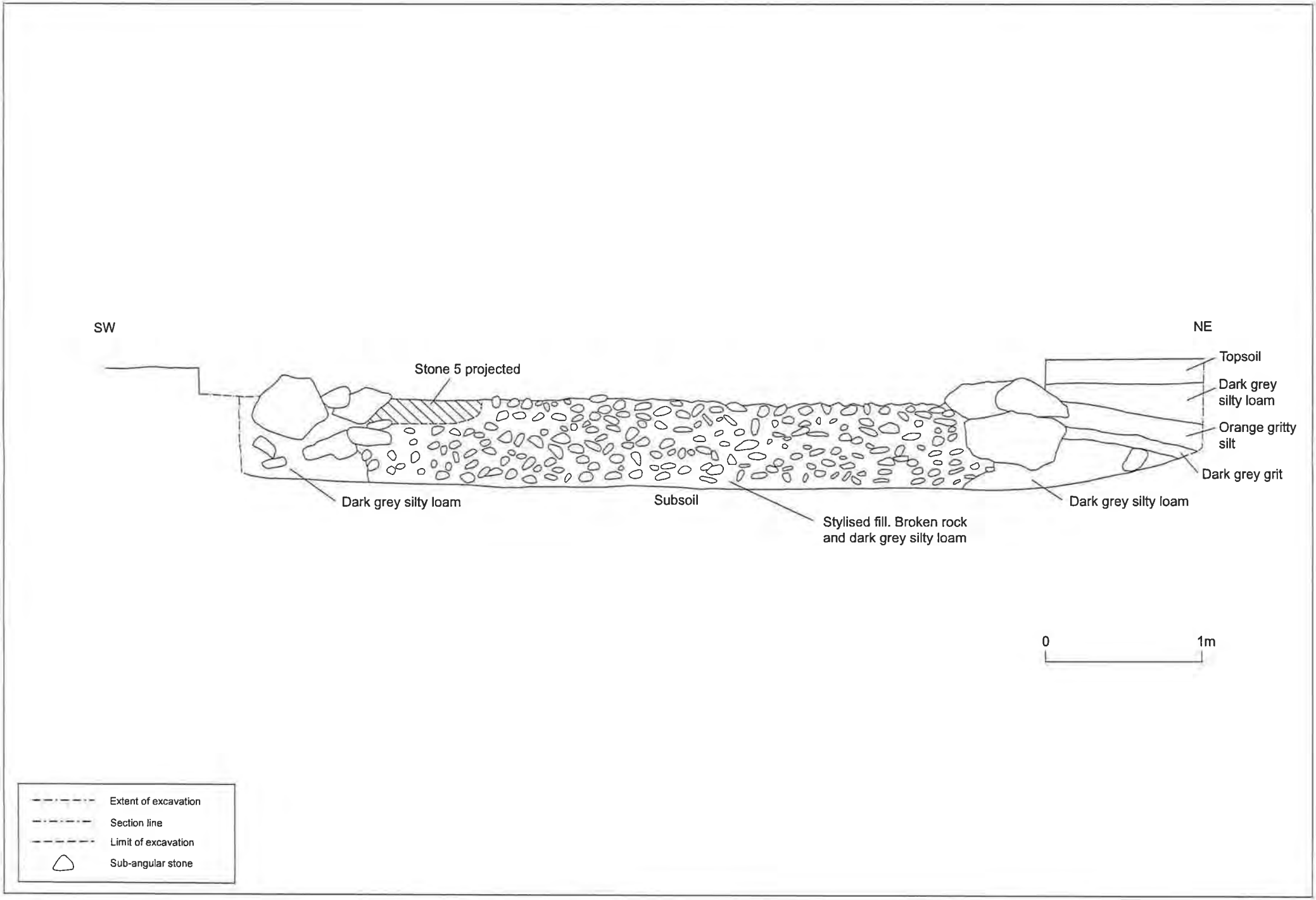

Figure 5. South facing section across the tramway (Feature 3).

Plate 1. Tramway at Herbernia Row, facing south west.

Plate 2. Detail of the tramway at Herbernia Row, facing north east.