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## A470 (T) DOLWYDDELAN TO PONT-YR-AFANC IMPROVEMENT : SITE 74

# WATCHING BRIEF



## Report No. 418

Prepared for National Assembly for Wales / Halcrow / Wyn Thomas Gordon Lewis

August 2001

by J.Kenney

Ymddiriedolaeth Archaeolegol Gwynedd Gwynedd Archaeological Trust

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## A470 (T) DOLWYDDELAN TO PONT-YR-AFANC IMPROVEMENT: SITE 74 (G1583)

## WATCHING BRIEF

#### Introduction

An environmental statement was prepared in 1992 (Halcrow 1992) to assess the impact of the improvement of the A470 (T) between Blaenau Ffestiniog and Betws-y-Coed, Gwynedd. Following this the affected archaeological sites were recorded by Gwynedd Archaeological Trust (Hopewell 1999). An alteration to the original proposals was necessary on the section between Dolwyddelan and Pont-yr-Afanc, involving the construction of a walled embankment on the eastern side of the road near the Cambrian Filling Station (the Prince Llewellyn Terrace retaining wall works). As this would lead to the disturbance of the north-western end of a quarry tramway (site 74), and the existing revetment wall supporting the eastern side of the road, Gwynedd Archaeological Trust were asked by WynThomasGordonLewis Ltd to carry out additional recording work. This work is described in Gwynedd Archaeological Trust report 384 (Kenney 2000).

Subsequent to the recording of this area the contractors, Jones Brothers of Ruthin, commenced the demolition of the north end of the tramway and the part of the revetment along the road. Jane Kenney, a staff member of Gwynedd Archaeological Trust, was present during the demolition phase to inspect and record known features, and identify any new features revealed by the demolition process. The demolition took place in sections, with each section being demolished and rebuilt before the next section was started.

The recording was mainly by monochrome photographs, which are archived in Gwynedd Archaeological Trust under project number G1583.

#### Results of the watching brief

#### Demolition phase 1

The initial demolition phase involved an access route being cut by machine through the northern end of the tramway. A 9m length of tramway was removed, leaving two profiles. There was no archaeological presence during this event, as the structure of the tramway could be best seen in the remaining profiles. On 6<sup>th</sup> March 2001 Jane Kenney visited the site and recorded, photographically and by notes, the profiles through the tramway (see plates 1 and 2).

The tramway was constructed with large slate slabs as facing stones and slate rubble as a core. Some of the original surface layers of the tramway could also be seen, but nothing else of interest was visible. No sections of track, or other ironwork, were discovered during demolition; the site manager, Stephen Williams, had undertaken to put aside any such items if they were found. Some large slate slabs, up to 1.9 x 0.7m in size, were salvaged from the demolition and stored adjacent to the access road. However, most of the original stone was extremely rotten, and did not survive demolition. This was clearly due to the condition of the stone, and not the nature of the demolition work. New stone used in the reconstruction will be appropriate slate from Blaenau Ffestiniog.

#### Demolition phase 2

The next phase of demolition involved the remaining 2m of tramway where it met the revetment, and the removal of the revetment itself up to a point about 5m south-west of feature 2 (as defined in Kenney 2000). The demolition was carried out by machine on 19<sup>th</sup> March.

The frosts had caused slumping on the top of the tramway where it joined the revetment wall, creating a crack. This suggested that the two structures were not bonded together. Careful removal of the tramway

end revealed the face of the revetment wall continuing behind it, and proved that the tramway had been built up against the earlier wall, without being bonded into it.

The revetment wall originally ended at this point, as the facing continued round the south-western end. There was also a buttress-like structure added, presumably to support the end of the wall, and this had also been buried beneath the tramway (see plates 3 and 4). The 'buttress' was not an effective support as it had slumped more than the revetment wall, so it may have had another function, not immediately clear from the visible section.

#### Demolition phase 3

A short section of wall including features 2 and 3, as listed in the assessment report, was demolished on 27<sup>th</sup> March. Both features were vertical joints within the construction of the wall. Parts of the wall were removed by machine to expose the south-western faces of each of these joints in turn, so that they could be photographed and notes made.

Feature 2 also formed one side of a pipe trench. The joint was not disturbed by the pipe trench, and the other side of the trench was also clearly defined. It appeared, therefore, that the trench had been constructed when the wall was being built, rather than cutting through it later. The cast iron pipe had been placed in the base of the trench, which was then roughly backfilled with stone rubble. Part of a tram rail was recovered from low down within the rubble backfill in a pipe trench. The rail is a fishbelly rail, probably bought second or third hand from Blaenau Ffestiniog (see report by D Gwyn below). If the above relationship of the pipe trench to the revetment wall is correct the rail cannot have been from the later tramway, and presumably originated from other tramways within the Prince Llwellyn Quarry.

Two sections of flanged cast iron pipe were recovered from the pipe trench, and these were photographed.

In the vertical joints large slabs had been used to construct substantial, relatively well-built corners (plates 5 and 6). This well constructed part of the south-western face was c.1m wide. The face did continue further into the revetment, towards the north-west, but it was very roughly built. Similar roughly coursed sections of stone work also occurred in places within the slate rubble behind the faces.

### Demolition phase 4

On 30<sup>th</sup> May a pipe trench was dug transversally across the revetment wall between features 6 and 7 (see plan in Kenney 2000). Behind the face of the wall was a mass of slate rubble, but with occasional large pieces set horizontally. The rubble became more ordered closer to the face of the revetment. The trench was photographed, but revealed nothing new about the site. The remainder of the revetment wall had c.1.5m removed from its top, allowing a concrete foundation for the new roadside wall to be built directly on top of the old revetment wall. This process revealed no new information. The surviving sections of revetment wall were buried under the embankment constructed to reinforce the improved road.

#### Discussion

The excavation of the northern end of the tramway clearly demonstrated that it was built up against the preexisting revetment. The road, which at present runs along the top of the revetment, appears on the map evidence to have been constructed along its present route between 1863 and 1889 (CRO: X/Plans/RD/17; 25" map). It was suggested by Kenney (2000) that the tramway merged with the road, and may have run along it. The watching brief demonstrated that this apparent merging was an illusion caused by the revetment being aligned at a slight angle to the road. In fact it seems more likely that the tramway continued straight on, across the revetment. The 1889 map (OS 25") shows a bank continuing the line of the tramway west of the road. This interpretation would suggest that the tramway pre-dated the road and went out of use when the road was constructed.

The information revealed in the watching brief has, therefore, led to a reinterpretation of the sequence of development of the site. The revetment wall is the earliest feature, the tramway was constructed against and over it, and finally the road was built along the top of the revetment, presumably causing the tramway to go out of use. As the revetment wall was not originally constructed to carry the road it must have had another function. This seems most likely to have been as a revetment to the eastern edge of the Prince Llewellyn Quarry tips and yards. The revetment was built when the road still continued around the western side of the quarry, and when the road was moved to its present line it was constructed over the revetment wall.

It is likely that the tramway was constructed around 1865, when Samuel Clift and Company leased the quarry of Chwarel y Fedw (CRO: XD38/279). The revetment wall therefore pre-dates this, and the road post-dates it. The revetment wall was, therefore, probably built in the early 1860s or before.

#### Vertical joints

The construction of the revetment wall is of some interest because of the vertical joints that characterise it. The south-western faces of these joints were rough and were not built to be seen, and the individual sections of wall were not constructed to stand alone. It is probable that the revetment wall was built sequentially from north-east to south-west, each section being finished with well-built corner and rough south-western face. Probably, the next section was then, immediately, built up against the face of the last.

This was a deliberate, planned construction technique, rather than haphazard extension of the length of the wall, as there were 12 of these vertical joints, spaced at fairly regular intervals. The purpose of this technique is unclear. As the revetment originally contained the slate heaps of the quarry, it might be suggested that this construction technique was designed to limit wall collapse in case of a slippage of the spoil heap. Just one section of wall would collapse, and it would not pull down a longer section of wall with it.

#### Summary

The watching brief clarified the problems of the relationship between the road, tramway and revetment. The revetment was the first of these structures to be built, probably in the early 1860s or before as a revetment to the quarry tips. The tramway was constructed over and against the revetment, probably around 1865. Finally the road was built over the top at some time before 1889.

#### Report on the fragment of rail discovered at Site 74 by Dr David Gwyn

The fragment of rail discovered at site 74 is part of what would originally have been a 18' long wroughtiron rail designed to be carried in cast-iron chairs on wooden sleepers or slab blocks. It is T-section, and it is clear from the surviving fragment that it was rolled in such a way as to have a deeper web (the vertical part of the T) at the mid-point between the chairs than at the chairs themselves. Rails such as this are commonly known as 'fish-belly' from the way the web deepens.

Wrought-iron rails began to supersede cast-iron rails in the early nineteenth century. An experimental use is recorded at Tindale fell in 1808, and it is likely that they were first introduced to the Welsh slate industry at Hafodlas Quarry (Cloddfa'r Coed) in Nantlle by its engineer John Hughes c. 1814 (Gwyn 1999). However, it is likely that these early rails were no more than simply section merchant bar. The use of more sophisticated rolling to produce the T-section and the belly was pioneered by the Bedlington ironworks in

the north-east of England for the Stockton and Darlington Railway in the early 1820s, ready for the railway's opening in 1825. Bedlington also supplied such rails for the Nantlle Railway between Cloddfa'r Lôn, opened in 1828. The Ffestiniog Railway, opened in 1836, used similar rails.

Wrought-iron fishbelly rails quickly became design-expired; practice from the 1830s onwards tended to use straight T-section rails, which gradually evolved into the chaired bullhead rail which is still used on much of the British main-line system (Lewis forthcoming). The increasing volume of slate that the Ffestiniog Railway was being asked to carry within a few years of its construction led its manager to phase out fishbelly rail from the 1840s, and it is clear that much was sold off second-hand from this date, though examples survived in sidings until much later (Boyd 1975). Second-hand rails, probably ex-Ffestiniog, have been found in a variety of locations in Merionethshire, including manganese mines high up on the Rhinogydd.

It is likely that the rails at Site 74 came from the Ffestiniog. It is not known when rails were first introduced at Bwlch Cynnud Quarry, but the railway over the river to Chwarel y Fedw is believed to have been laid in the early-mid 1860s. It is quite possible that the rail was acquired third-hand.

#### **Unpublished Sources**

X/Plans/RD/17 (1863) Plan of Portmadoc and Beaver Pool Bridge turnpike: Caernarfon Record Office

- Sir William Halcrow and Partners Ltd, 1992 A470 (T) Blaenau Ffestiniog to Betws-y-Coed Road Improvement Environmental Statement, appendix B – Heritage and Conservation
- Hopewell, D, 1999 A470 (T) Dolwyddelan to Pont-yr-Afanc Improvement: archaeological recording. GAT report 345

Kenney, J. 2000 A470 (T) Dolwyddelan to Pont-yr-Afanc Improvement: site 74. GAT report 384

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Boyd, JIC, 1975 The Ffestiniog Railway vol. 2 (Oakwood Press), pp. 373-4.

Gwyn, D Rh, 1999 'From Blacksmith to Engineer; Artisan Technology in the North Wales Slate Industry' Llafur 7, pp. 51-65.

Lewis, M J T, (forthcoming) 'Fishbelly and Flat-bottom' (title in preparation).

Richards AJ, 1991 A Gazetteer of the Welsh Slate Industry

William, M.C. and Lewis, M.J.T. 1989 Gwydir Slate Quarries. Snowdonia National Park Study Centre.

OS 25" map Caernarvonshire sheet XXIII.11, 1889

## Appendix

#### Daily watching brief reports

## 16th February 2001

Jane Kenney visited the site to liase with the road contractors, in relation to the watching brief on the road revetment wall opposite Cambrian Garage. She arrived at the site compound just before 14:00, and had a 30-minute meeting with Stephen Williams of Jones Brothers. The general timetable of work was discussed, and then the actual site was viewed.

The work will be undertaken in sections, with each section being demolished and rebuilt before the next section is started. The first section to be undertaken is the northern end of the tramway itself, from the field gate to a point about 2m south of the roadside wall. This will not require a watching brief, although Stephen Williams undertook to put aside any pieces of tramway or other ironwork that might be discovered. The tramway is to be demolished by machine, the stone is to be stored off site and used to reconstruct the tramway after consolidation. The stone is very rotten and there is unlikely to be sufficient original stone surviving demolition. Any new stone used will be appropriate slate from Blaenau Ffestiniog.

Stephen Williams pointed out the difficulty, and possible danger, of reconstructing the walls exactly as they are at present, as they were not particularly well built. Jane Kenney suggested that it was important to maintain the character of the walls, rather than precisely reconstructing them, and in fact it is preferable that the difference between genuine and reconstructed walls should be clearly visible.

The first stage of work is estimated to take at least two weeks. The next stage involves the junction between the tramway and the southern end of the road revetment. This is the area of particular archaeological interest, as it may reveal the relative chronology between the two structures. A member of GAT staff must be present when this section is being demolished to make a photographic record of any interesting features. The northern-most end of the tramway will be left until this stage, and should also be photographed to record its construction in section.

The following section includes some of the vertical joints, which characterise the construction of the revetment. A watching brief should be carried out on their demolition in order to ascertain their construction and function. There is also ironwork, such as sections of tram-track, which would be worth noting. Whether a watching brief is necessary on the remained of the revetment will be decided from the results of the watching brief on this section. It is advised that no effort should be made to reconstruct the vertical joints, as they would add weakness to the new revetment, and have already been adequately recorded.

Stephen Williams will inform Jane Kenney of the progress of the works, so that she can visit the site at appropriate times to carry out recording. It is anticipated that the recording will involve only photography and note taking, and will cause minimal disturbance to the work on site.

## 6th March

Jane Kenney visited the site after being informed that the tramway section had been demolished. A section c.9m in length had been removed, leaving two profiles through the tramway, which were recorded, photographically and by notes. The tramway was constructed with large slate slabs as facing stones and slate rubble as a core. Some of the original surface layers of the tramway could also be seen, but nothing else of interest was visible. No sections of tram-track, or other ironwork, were discovered during demolition. Some large slate slabs, up to 1.9 x 0.7m in size, were salvaged from the demolition and stored adjacent to the access road. However, most of the original stone was extremely rotten, and did not survive demolition. This was clearly due to the condition of the stone, and not the nature of the demolition work.

This gap in the tramway will be left open, as an access route, until the rest of the work has been completed.

### 19th March

Jane Kenney arrived on site 7:20am and stayed until 11:10am, to be present during the demolition of the first stretch of the tramway. The area demolished included the remaining northern end of the tramway, and the south-western end of the revetment wall, up to a point about 5m south-west of feature 2. Demolition was carried out by machine.

The frosts had caused slumping on the top of the tramway, where it joined the revetment wall, creating a crack. This suggested that the two structures were not bonded together. Careful removal of the tramway end revealed the face of the revetment wall continuing behind it, and proved that the tramway had been built up against the earlier wall, without being bonded into it.

The revetment wall originally ended at this point, as the facing continued round the south-western end. There was also a buttress-like structure added onto this end, presumably to support the end of the wall, and this had also been buried beneath the tramway.

It seems that the revetment wall was not related to the road, but was constructed to revet the eastern edge of the Prince Llewellyn Quarry tips and yards. It was built when the road still continued around the western side of the quarry, and when the road was moved to its present line it was constructed over the revetment wall. As it has now been proved that the revetment pre-dates the tramway, which probably dates to c.1865, the revetment must have been built in the early 1860s or before.

The tramway probably continued across the revetment, and is represented on the 1889 map as a bank continuing its line on the western side of the road.

The sequence as demonstrated by the stratigraphy seen on site is that the revetment was built to contain the quarry, the tramway was built against and over it, and then the road was constructed over both, and the tramway must have gone out of use.

Part of a tram rail was recovered from low down in a pipe trench cut through the revetment wall (feature 2), presumably when the road was constructed. The rail is presumably from the tramway and suggests that the tramway went out of use when the road was built.

### 27th March

Jane Kenney was on site between 7:00 and 8:30am to watch the demolition of another short section of revetment wall. This section included features 2 and 3 as listed in the assessment report. Both features are vertical joints within the construction of the wall. Parts of the wall were removed by machine to expose the SW face of each of these joints in turn, so that they could be photographed and notes made.

Feature 2 also formed one side of a pipe trench. The joint was clearly not disturbed by the pipe trench, and the other side of the trench was also clearly defined. It, therefore, appeared that the trench had been constructed when the wall was being built, rather than smashing through it later. The cast iron pipe had been placed in the base of the trench, which was then roughly backfilled with stone rubble.

In the vertical joints large slabs had been used to construct substantial, relatively well-built corners. This well constructed part of the SW face was c.1m wide. The face did continue further into the revetment, towards the NW, but it was very roughly built. Similar roughly coursed sections of stone work also occurred in places within the slate rubble behind the faces. It appeared that the SW faces of these joints were not built to be seen, and that the sections of wall with a vertical joint at the SW end were not constructed to stand alone. The revetment wall was built sequentially from NE to SW, each section being finished with well-built corner and rough SW face. Probably, the next section was then, immediately, built up against the face of the last.

This was a deliberate, planned construction technique, rather than haphazard extension of the length of the wall, as there were 12 of these vertical joints, spaced at fairly regular intervals. The purpose of this technique is unclear. As the revetment originally contained the slate heaps of the quarry, it might be

suggested that it was designed to limit wall collapse in case of a slippage of the spoil heap. Just one section of wall would collapse, and it would not pull down a longer section of wall as it went.

The remaining part of the revetment wall is only to be taken down c.1.5m below the level of the road, so it is anticipated that little more of significance will be found. The watching brief will continue, at least for the next section to be demolished, to establish the potential for further discoveries.

## 30th May

Stephen Williams informed Jane Kenney that a pipe trench was being dug across the revetment wall. Jane Kenney arrived on site at about 10.40 to inspect and record the trench, which had been dug transversally through the wall, between features 6 and 7 (see plan in GAT report 384). Behind the face of the wall was a mass of slate rubble, but with occasional large pieces set horizontally. The rubble became more ordered closer to the face of the revetment. The trench was photographed, but revealed nothing new about the site.

Stephen Williams had set aside two large, flanged cast iron pipes, which were recovered from feature 2. These were photographed and are at present being kept in the storage enclosure next to the site offices.

A problem was pointed out with the circulation of information on the project, in that Stephen Williams, as site manager for Jones Brothers, was not receiving the watching brief reports produced by GAT. This made it impossible for him to complete his Environmental Action Plan. Recognising that GAT could not act directly on this problem, Jane Kenney promised to inform Catherine Holland of the problem.

Jane Kenney left site at 11.25, and on returning to the office informed Catherine Holland about the problem with the Environmental Action Plan.

## 8th August

Following a visit to the Forest Enterprise site Jane Kenney visited site 74. All the demolition work has been completed. The last phase of demolition involved the removal of c.1.5m along the top of the revetment wall, but this revealed nothing of interest. The concrete revetment has been built and the embankment constructed against it. Most of the reconstruction of the roadside wall is now complete, and the end of the tramway will be reconstructed shortly.



Plate 1: profile through tramway. Looking south-east



Plate 2: profile through tramway. Looking north-west



Plate 3: South-west end of revetment wall revealed after removal of tramway



Plate 4: End of revetment showing buttress and remains of tramway built up against south-western end.



Plate 5: Vertical joint, feature 3 Looking north-west



Plate 6: Vertical joint, feature 3 Looking north-east