

## **Geomorphology survey**

### **River Clywedog – Felin Puleston Weir removal**

#### **Basic site information**

Address: Weir near to Felin Puleston Outdoor Centre (Erddig), Wrexham LL13 7RF . River Clywedog.

Grid reference of weir: SJ 32565 49299

Elevation of weir crest: 71.3m a.o.d.

The impacted reach following removal will be from SJ 32519 49332 upstream to approximately SJ 32586 49249 downstream, a length of 120m. This reach will be positively impacted, and although the bed slope wont change over the reach, the removal of the weir will create a more natural gradient along its length and allowing the free passage of both species and sediment.

#### **Weir information**

Width along crest	10.5m
Wetted width at crest	6.3m
Total hydraulic head	1.1m
Length of structure	0.9m
Type of structure	Stepped weir
Number of steps	3

The following report shows the river Clywedog from approximately 500m downstream, to 500m upstream of the weir. The map on the following page shows where each photo was taken from and the direction of view.

Abbreviations used throughout the captions include

LHB – Left hand bank, looking downstream

RHB – Right hand bank, looking downstream

Where mentioned sediment size refers to

<b>Name</b>	<b>Size</b>
Boulder	>256mm
Cobble	64mm – 256mm
Gravel	2mm – 64mm
Sand	62.5 µm – 2mm
Silt/clay	<62.5µm





1 – SJ 32758 48929 Vegetated mid-channel bar (gravel with some cobble).  
Eroding LHB approx. 2m high. Inset of sediment size.



2a – SJ 32789 48936 Predominantly gravel bed, with occasional cobbles and finer sediment accumulating on RHB.

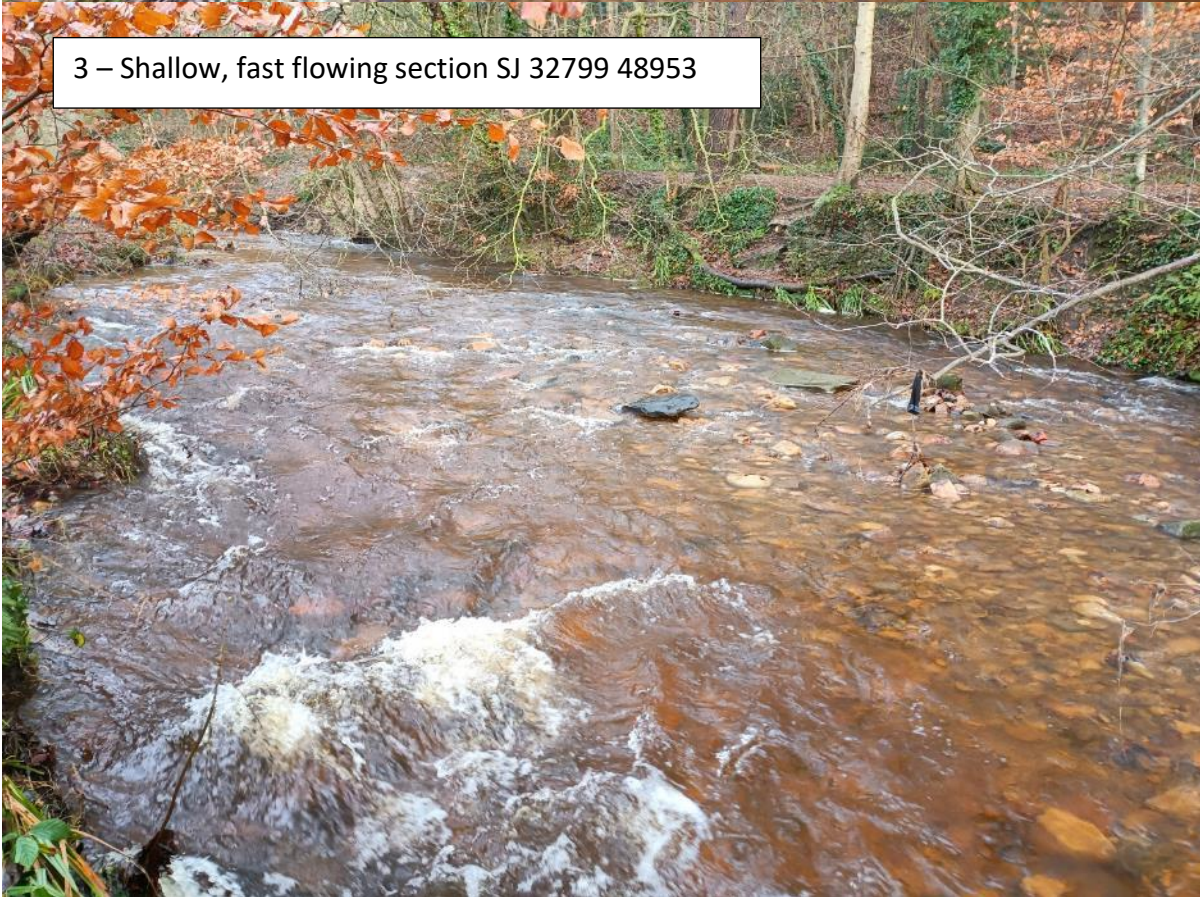




2b – SJ 32789 48936 Tree and roots interacting with channel on LHB, deep channel beneath roots, accumulation of cobbles on RHB.



3 – Shallow, fast flowing section SJ 32799 48953

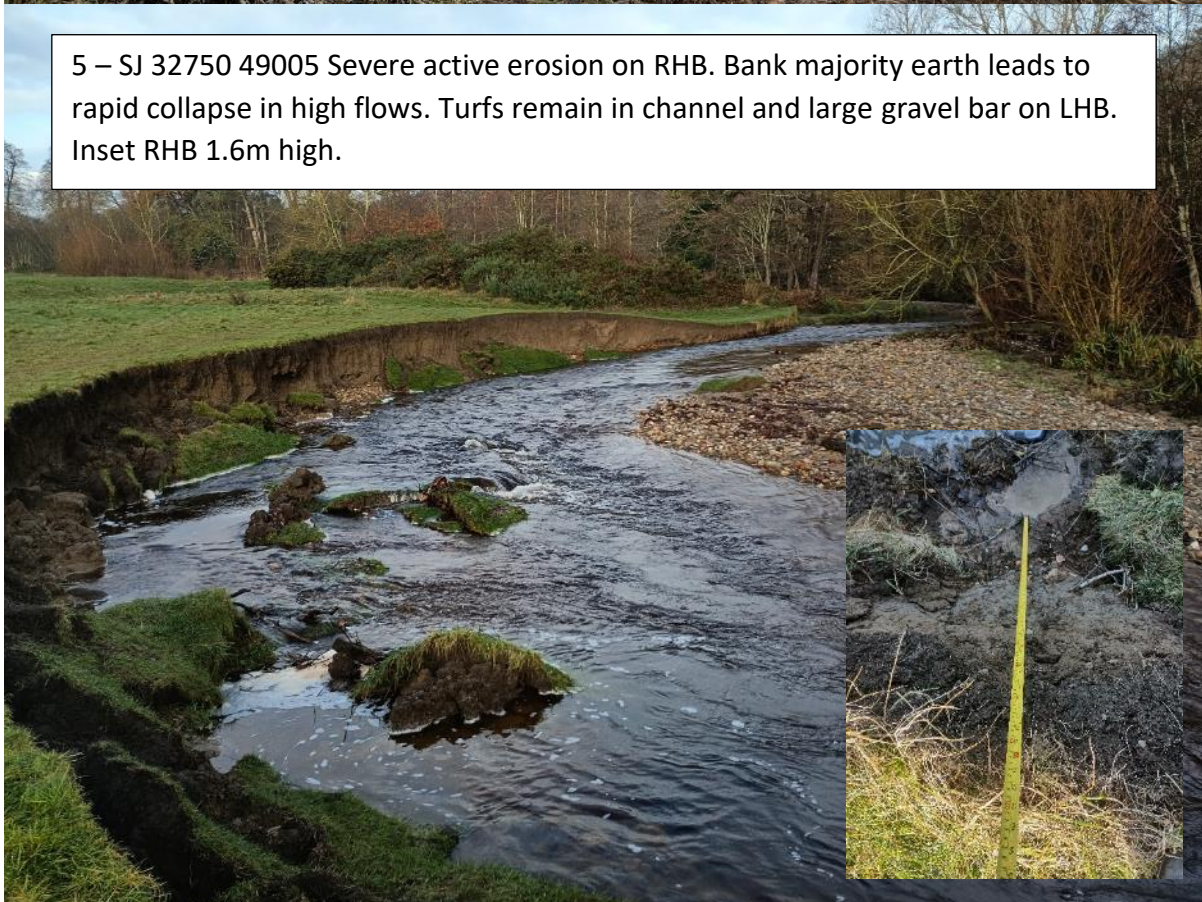




4 – SJ 32809 49006 Clear evidence of flood flows interacting with historic channel. Gravel and sand bar formed on LHB



5 – SJ 32750 49005 Severe active erosion on RHB. Bank majority earth leads to rapid collapse in high flows. Turfs remain in channel and large gravel bar on LHB. Inset RHB 1.6m high.





6 – SJ 32731 49047 Deeper, slower section of river with vegetation interacting with channel on LHB, gravel bar formed on RHB. Inset channel sediment size -

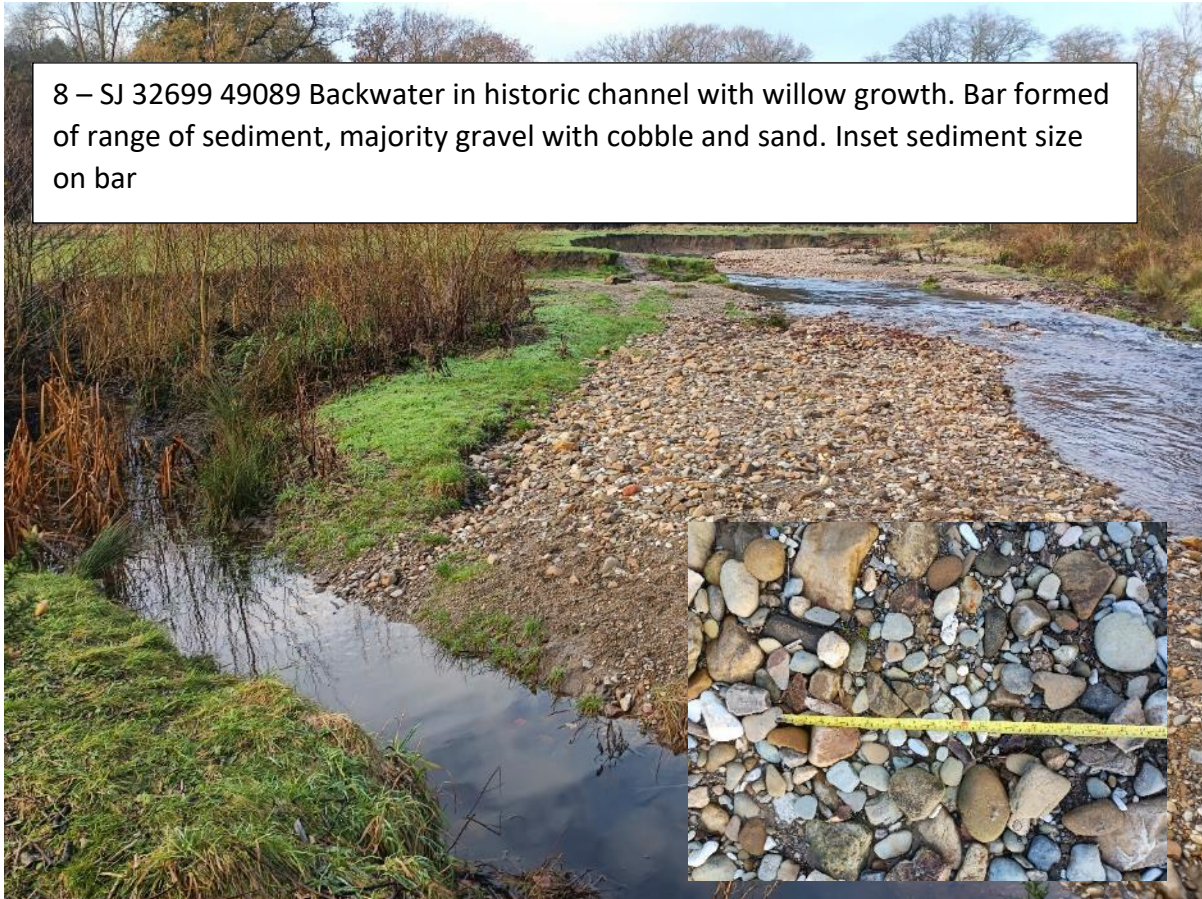


7 – SJ 32743 49069 Riffle section with more cobbles, gravel bar formed on RHB





8 – SJ 32699 49089 Backwater in historic channel with willow growth. Bar formed of range of sediment, majority gravel with cobble and sand. Inset sediment size on bar



9 – SJ 32634 49105 Severe active erosion on RHB where earth bank rapidly eroding to channel. Large gravel bar on LHB and turfs remaining in channel. Inset RHB height 1m

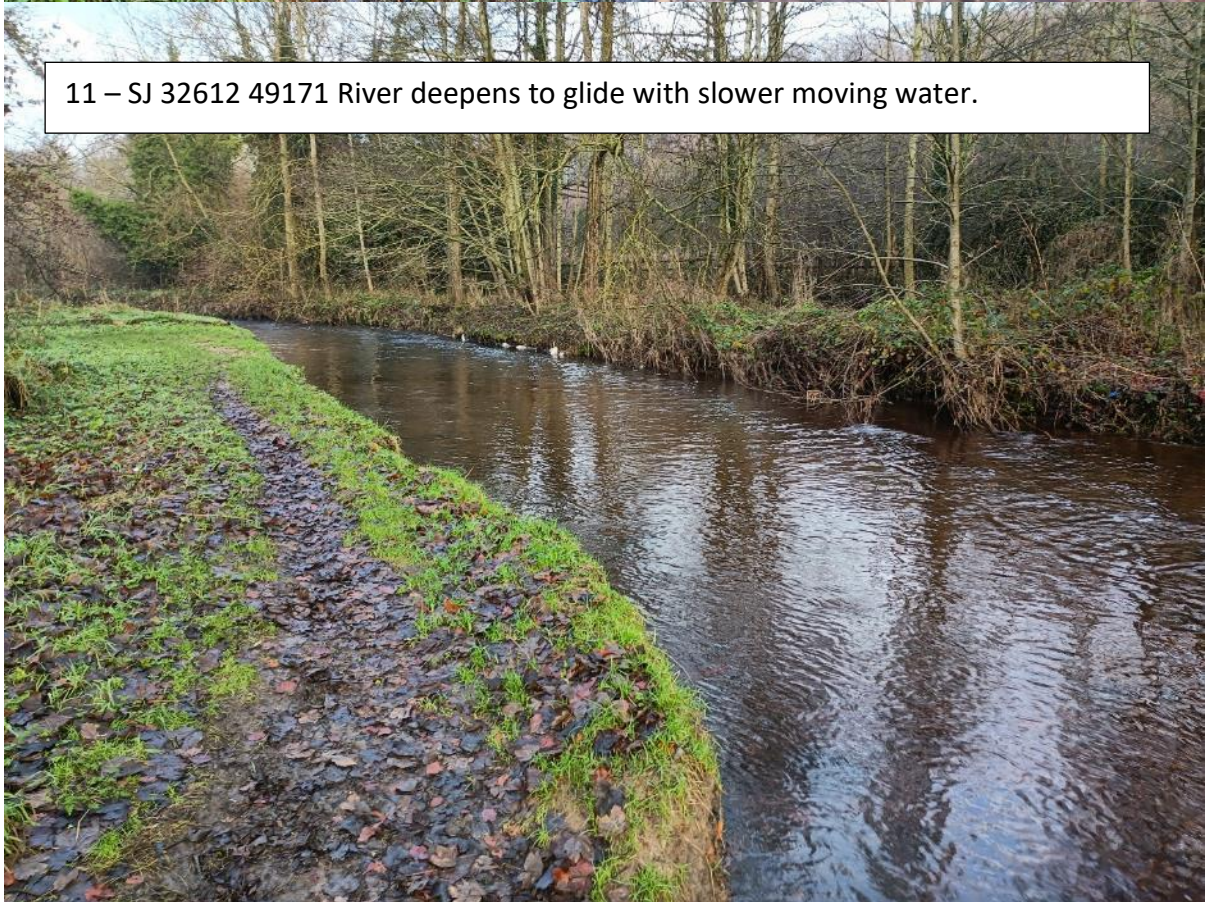




10 – SJ 32611 49143 Shallow riffle section with cobble bed.



11 – SJ 32612 49171 River deepens to glide with slower moving water.





12 – SJ 32603 49215 Riffle run section. Looking upstream to rapid 3



13a – SJ 32579 49248 Collapsed gabion baskets on LHB





13b – SJ 32579 49248 High bank with failing gabion baskets on RHB



14 – SJ 32568 49268 View of failed gabions on LHB and tree interacting with channel on RHB. Looking downstream to rapid 3





15 – SJ 32568 49282 Section downstream of weir generally narrow channel. Willow and large woody material in channel on RHB. Photo looking upstream to rapid 2 site.



16a – SJ 32564 49293 RHB of weir. Severe erosion around concrete weir structure. Looking upstream to rapid 1





16b – SJ 32564 49293 LHB of weir. Tree growth in channel restricting flow to LHB and failing gabions along LHB.



16c – SJ 32564 49293 Mid channel gravel cobble bar formed below weir and plunge pool, creating fast flow toward RHB





17 – SJ 32561 49299 Across top of concrete weir, finer sediment held behind crest



18a – SJ 32559 49312 Large blockstone and gabion revetment on LHB above weir





18b – SJ 32559 49312 Failing gabion revetment on LHB. Comparatively deep and slow water above weir. Rapid 1 site



19a – SJ 32542 49309 Floodplain showing residue from recent flood





19b – SJ 32542 49309 Floodplain showing sediment deposition from recent flood

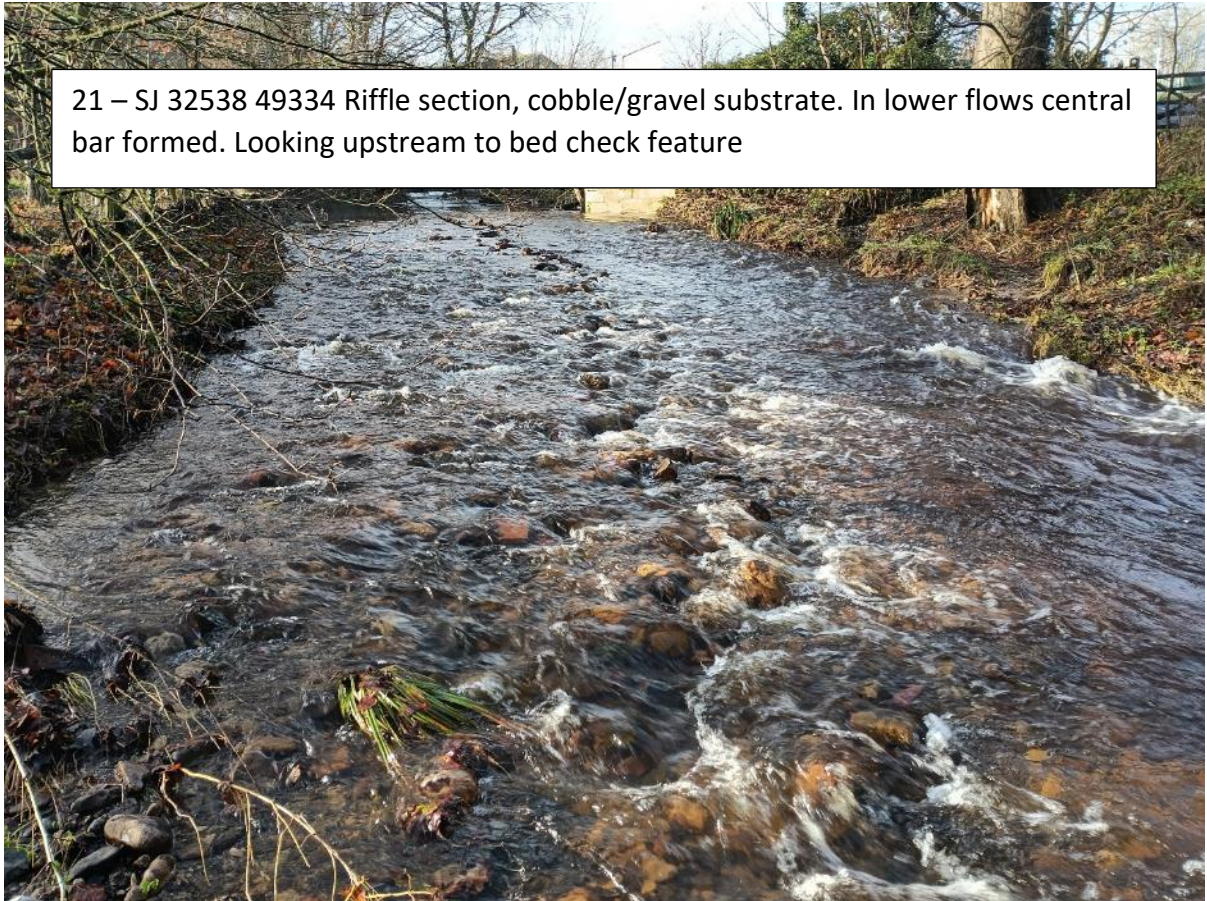


20 – SJ 32544 49328 Large woody material accumulation in channel and failing gabions on LHB.





21 – SJ 32538 49334 Riffle section, cobble/gravel substrate. In lower flows central bar formed. Looking upstream to bed check feature



22a – SJ 32498 49328 Riffle section, cobble/gravel substrate. In lower flows central bar formed. Looking downstream to bed check feature.





22b – SJ 32498 49328 Footbridge crosses river, stone work bridge piers and tree growth





22c – SJ 32498 49328 Footbridge crosses river, stone  
work bridge piers and service crossing





22d – SJ 32498 49328 LHB stonework and blockwork. Mid channel island forming with riffle and vegetated bar on LHB by bridge pier.



23a – SJ 32463 49318 LHB stonework. Mid channel island forming and vegetated bar on LHB behind bridge pier.





23b – SJ 32463 49318 LHB brickwork and failed stonework and gabions protecting industrial estate. River fairly deep and slow



24 – SJ 32460 49313 LHB brickwork and gabions protecting industrial estate. RHB is not reinforced. Channel along this section narrower than downstream of





25 – SJ 32442 49281 LHB gabions protecting industrial estate with historic channel narrowing. RHB is not reinforced



26 – SJ 32372 49275 Steep earth RHB. Large gabion wall on LHB, some collapsing mid picture. Some sediment deposition on LHB.





27a – SJ 32370 49285 Steep earth RHB. Large gabion wall on LHB. Some sediment deposition and vegetation growth on LHB.



27b – SJ 32370 49285 Channel widens through road bridge. Shallow riffle section





28a – SJ 32352 49297 LHB brickwork and concrete reinforcement, riffle section with cobble bed, inflow from wet woodland on RHB



28b – SJ 32352 49297 LHB brickwork headwall, drain from industrial estate. Concrete toe protection on LHB





29 – SJ 32316 49303 Riffle section with cobble gravel bed, recent deposition of large sediment on RHB, gravel bar on LHB. Some willow revetment on RHB.



30 – SJ 32298 49309 Riffle section with cobble gravel bed, beneath railway bridge. LHB and bridge protected with brickwork.

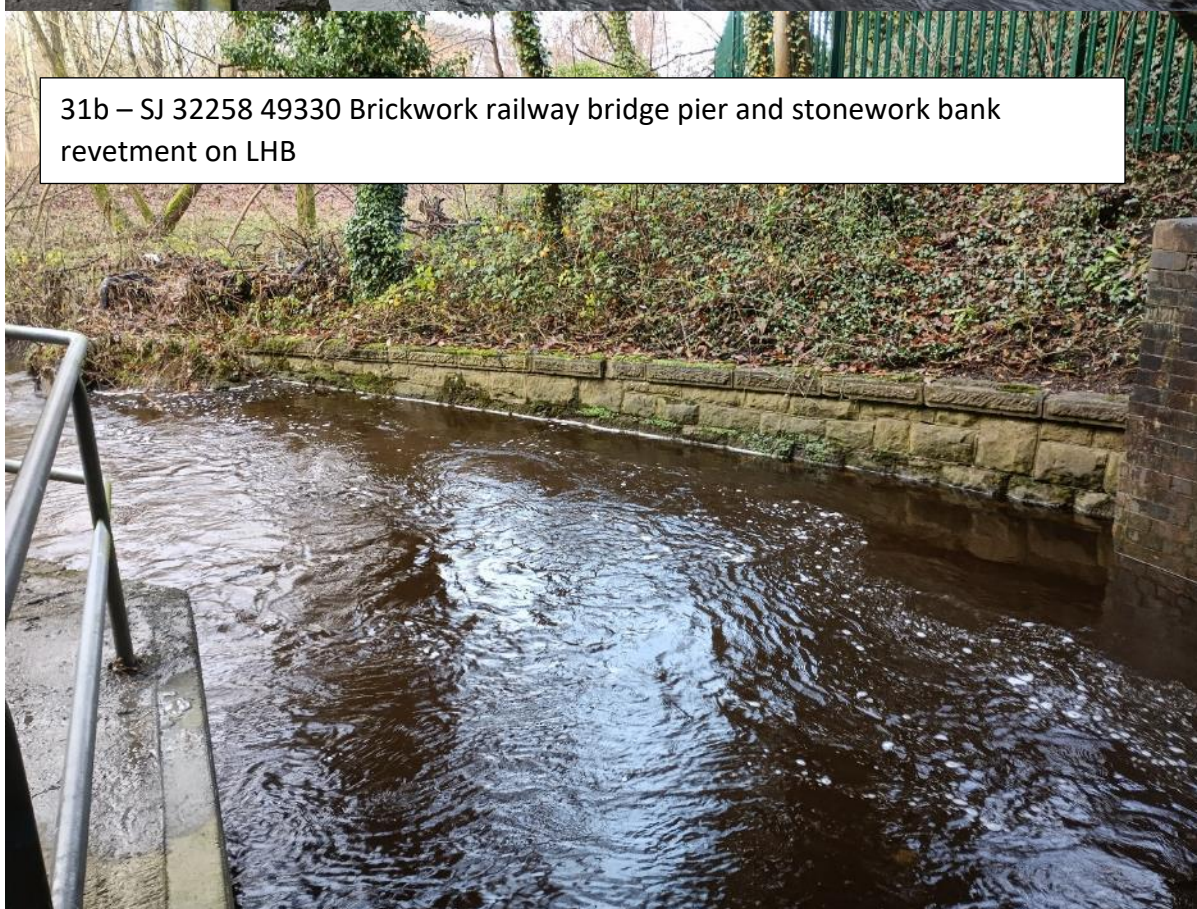




31a – SJ 32258 49330 RHB concrete beneath railway bridge, footbridge leading off. Less protection on LHB until bridge pier. Deep section



31b – SJ 32258 49330 Brickwork railway bridge pier and stonework bank revetment on LHB







32 – SJ 32237 49335 RHB stonework revetment upstream of footbridge, then more natural channel. LHB unprotected, vegetation interacting with channel.