



Geotechnical Division Case Study Brook Street Bridge Slope Stabilisation

As part of the Brook Street Bridge Replacement Project, Griffiths Geotechnical were tasked with delivering slope stabilisation works to support a crane pad and piling platform to facilitate the installation of the permanent works.

Brook Street Bridge was a footbridge replacement scheme undertaken for Rhondda Cynon Taf (RCT) County Council in collaboration with Transport for Wales (TfW) as part of the Core Valley Lines (CVL) upgrade and electrification works. The existing bridge was at the end of its design life and needed replacing to comply with current standards and provide additional pedestrian and cycle links in the local area.

The main ground improvement works included installation of Sectional Flight Augered piles (SFA) to support the bridge foundations and vertical columns. The bridge would be lifted into place using a large 700T crane working from a robust temporary platform.

The location identified by the Griffith's Project Management team as the only position to install a crane pad was at the top of a soil slope immediately adjacent to the operational railway which had a haul road cut through the middle of it to provide access to the main work site location.

Griffiths' appointed Pascoe Consulting Engineers who to produce a Temporary Works Design (TWD) to install Platypus Anchors with reinforced mesh, secured with timber hardwood sleepers complete with a large Galvanised plate to secure the system in place.

Prior to any works commencing on site, a significant amount of mature vegetation needed removing from the steep slopes adjacent to the railway. Using planned nighttime railway possessions, our highly skilled team of rope access technicians completed the works over a 4-week period ensuring all trees were felled without disruption or damage to the railway infrastructure.

To minimise disruption to lineside residents, battery operated chainsaws were used to fell trees, with processing of material taking place during daytime shifts. All arisings were delivered free of charge to a community project for recreational use.



TOP: Installation of platypus anchor from toe using 3T excavator
BOTTOM: Installation of platypus anchor from top using 13T LR

All large tree roots were removed to prevent any risk of anchors refusing, followed by ground improvements to prevent localised slumping, therefore reducing the risk during large crane movements.

Griffiths have extensive experience working in close proximity to the railway whilst it remains fully operational. Our experienced rail team have the relevant skills, knowledge and competencies to plan and mitigate complex working scenarios to ensure our works can be undertaken safely and effectively without endangering or disrupting the operational railway.

Brook Street required an Any Line Open (ALO) procedure to be planned and executed with strict control measures implemented. Using our own ALO coordinators to supervise the works, our excavators fitted with slew restrictors worked in accordance with the plan in isolated safe working zones without compromising the safety of the railway.

Due to the restrictive nature on site and narrow access track at the toe of the slope, several different excavators fitted with hydraulic hammers were required to install the anchors to the required depth. Griffiths own and operate an extensive fleet of plant and equipment based locally in South Wales which enabled flexibility and assurance for the site team to change plant when required without compromising safety, programme and abortive costs.

The TWD required a strict installation sequence from toe to crest to mitigate slope failure during works.

Using a combination of a 3t 360° excavator and a 180° excavator from the haul road, 50% of the anchors were installed to the required sequence. Utilising a 13t 360° long reach excavator positioned 3m offset from the crest ensured the remaining 50% of anchors were installed as per sequence without compromising the slope stability or safety of staff in the during the operations.

Working collaboratively with our client and temporary works designers, Griffiths were able to ensure that all working anchors were installed to mitigate interference with the permanent works, and with no grout required there was less chance of any failure following the installation of the piles.

In total, 32no Platipus anchors (B6 and B10) were installed to a minimum installed depth of 7m and loaded to 50kN with 150m² of B785 mesh laid on top of a geotextile blanket, with 1250 x 250 x 150mm D40 hardwood sleepers and 200 x 200 x 6mm plates at each anchor point.

Griffiths have a wealth of experience in slope stabilisation works, often involving complex risks to health and safety, environment and the quality of the delivered solution.

In the case of Brook Street Bridge Slope Stabilisation, it was critical to determine the main immediate risks to health and safety due to the requirement to complete construction works within close vicinity of the operational railway without compromising the stability of the slope.

All works were completed over a 3-week period on time, in budget and to the satisfaction of our client and temporary works designer.



Project details at a glance

Client: Rhondda Cynon Taf County Borough Council

Location: Gelli, Rhondda Cynon Taf

Completed: May 2022

Value: £150,000

Contract: NEC4 Option A

Fig 1: Warning sign for ALO control measures

Fig 2: Installation of platypus anchor using 180° Excavator

Fig 3: Loading platypus anchor for lock off

Fig 4: Long reach excavator at crest of slope