Barhale

New Cumnock Flood Protection

Client:	East Ayrshire Council
Location:	Leggate, New Cumnock, East Ayrshire
Value:	£770k
Duration:	18 weeks

In Brief...

Over the course of 2013 and 2015 the residents in the town of New Cumnock, East Ayrshire had been badly affected by flooding. East Ayrshire Council appointed Barhale to complete Phase 1 of the flood protection scheme; installing preventative measures in the rural Leggate area to the West of the town. This area had flooded due to the Connel Burn (a stream that runs in amongst the homes) over-spilling its banks.

Barhale installed embankments and a concrete channel

New concrete walls and embankment

Technical Features...

Barhale were engaged as Principle Contractor to install water retaining earthwork flood embankments and to install in situ reinforced concrete walls within Connel Burn. The works consisted of concrete walls, embankments, bank erosion protection and side overspill upstream of Leggate to reduce flow into the Connel Burn.

Before concrete defences could be installed within the burn the flow was diverted to provide a dry working environment. Barhale installed 48m of 1200mm diameter pipe to carry the flow for the duration of the works.

Having diverted the flow, trimming was carried out within the streambed to remove stones and debris and to level the surface for the installation of the cast in situ concrete. The steel reinforced concrete walls and base were then installed within the burn over a length of 50m. This area is where Connel Burn runs in close proximity to residential homes. The concrete section formed a squared U shape to minimise potential for overspill once the burn was reinstated. To provide further flood protection the embankments were raised by 1m.

A side wall overspill was created upstream from the Leggate area to encourage flow away from Connel Burn in future flood events. This would instead result in natural drainage of excess water away from the burn.

At Knockshinnoch Farm bank erosion protection was to be installed, and the original plans had been to utilise concrete reinforcement. However, designs were revisited and changed due to the location of adjacent buildings. The team instead utilised rock armour and geotextile material. Geotextile material was also utilised for the new embankments upstream to create and then maintain shape.

Innovative Design...

Throughout this project, the team encountered a number of elements which required redesign. They were able to provide innovative solutions which resulted in benefits for the Client and Customers. For example, there was the aforementioned revision of bank erosion protection as well as value engineering which led to the replacement of some concrete walls within the burn with clay and earthworks. This decision was very well received by the local fisheries management as it meant a reduction of concrete in the waterway.

Constraints...

The majority of constraints encountered throughout this project were environmental. The team ensured to mitigate and control any potential challenges with regards to environmental and ecological factors. An Emergency Response Plan was also put in place in case of flooding during works.

The team were aware of protected species nearby and so ensured environmentally considerate work. This included pre-commencement surveys of nearby otter habitats to assess the impact the works would have and ensure no major detrimental impact.

Constraints cont...

Noise and vibration were minimised in efforts to prevent otters from utilising nearby roads and risk coming into contact with vehicles. Nearby badger setts were located and an exclusion zone of 30m was put in place where possible. A qualified environmental specialist was also engaged to survey nearby trees for nesting birds. This ensured no trees containing nests were cut down.

A further constraint was the close proximity to residential homes. To minimise disruption to residents in the form of dust and noise, the team carried out work considerately and no work was undertaken during antisocial hours.

Benefits...

1400 tonnes of excavated materials which was unsuitable for use on site, i.e. (Materials did not comply with the specification for Topsoil and was not suitable for re use on the site). This material was given free issue to the local farmer who utilised the material for re profiling an embankment on his land. Eliminating the need for us to transport off site and provided us with a cost saving for not sending to a licenced tip. Throughout the project at Leggate, traffic to and from site was limited in consideration of the home owners.

The site compound was in close proximity to residential properties

Barhale employees at New Cumnock Primary School for the Bridges to Schools activity

Considerate Constructors Scheme...

This project scored well on the Considerate Constructors Scheme and was described as "one of the best small projects" that the CCS representative had ever visited and was awarded a 'Performance Beyond Compliance' certificate from the organisation. The site was commended for the following reasons:

Environment: a site specific ecological management plan detailed management of the surrounding environment, including dealing with otters, nesting birds and badgers. These were all identified within the monthly ecology reports prepared by a visiting ecologist. The team on-site also assisted the local fishery board in relocating young fish from a section of the watercourse that was being upgraded.

As part of World Environment Day, site operatives cleared plastic and other rubbish from the watercourse. Re-usable, biodegradable bottles were issued to operatives instead of disposable cups.

Workforce: apprenticeships are encouraged throughout the business and one recent school leaver was recruited at this site. A female graduate engineer was also recently recruited and given work experience on this project.

Community: our Site Manager personally delivered pre-start information to those affected in the nearby area and Community Councillors attended a meeting the first day on site. The Client circulated monthly reports and advance notice was issued for any disruptive works. 24/7 contact information was displayed and consideration and respect for neighbours was included in induction.

A Traffic Management Plan listed restrictive timings and was circulated to our supply chain. This meant that loads were split to avoid large, disruptive deliveries. Further to this, all parking was on site to minimise disruption. It was mainly local labour on site with local subcontractors and suppliers being targeted by the business.

Our Site Manager also arranged for new kerbs to be installed across some residents' driveways to protect against flooding and a memorial bench removed for the works was renovated before being reinstalled within a new rockery.

Bridge Building at a Local School...

A number of Barhale team members visited New Cumnock Primary School to introduce the children to some of the fundamentals skills and techniques of civil engineering. The Barhale team, including our Graduate & Trainee Engineers, interacted with 64 nine to eleven year-olds and worked through the Institution of Civil Engineering "Bridges to Schools" activity. This is a fun, interactive task where the children engage in building, walking across and then dismantling a 13m long cable stayed bridge. This activity was a resounding success:

"The pupils have really enjoyed their experience and embraced the opportunity to learn about the flood prevention scheme," says Head Teacher, Joanna McMurdo. "The Bridges to Schools event provided the children with a great opportunity to work as a team to learn about civil engineering. Thank you to Barhale and East Ayrshire Council for providing this opportunity and involving the community in this project."