

EAST AYRSHIRE COUNCIL

DEVELOPMENT SERVICES COMMITTEE – 15 JANUARY 2003

DAMAGE TO SHEET PILED PROTECTION WORKS AT BRIDGE NO. F/NEWM/20, MURE PLACE FOOTBRIDGE, NEWMILNS

Report By Director of Development Services

1. PURPOSE OF REPORT

1.1 The purpose of this report is to:

- (a) inform the Committee of the collapse of the sheet piled wall, which protects the north abutment of the footbridge from river scour at Mure Place in Newmilns; and
- (b) advise the Committee of the investigations which have been carried out and recommend remedial measures.

2. BACKGROUND

2.1 The footbridge is a 15.3m single span steel bridge across the River Irvine and links Mure Place and Brown Street in Newmilns. The bridge is owned by East Ayrshire Council, as is the area of land on which the north abutment of the footbridge is founded. The works and the river banking in the immediate vicinity are protected by a 20.5m length of steel sheet piling capped with a 2m wide concrete slab.

2.2 In February this year part of the sheet piles gave way and a section of the concrete slab collapsed, leaving the riverbank and the bridge abutment exposed. A detailed inspection of the site confirmed that there was scour damage to the sheet piling with erosion of the backfill material.

2.3 At the moment there is no immediate danger to the footbridge and it remains open to the public. However the situation is being closely watched for any sign of further damage to the scour protection.

2.4 In addition to the above damage there is severe erosion of the north riverbank immediately downstream of the footbridge. This erosion had been evident for some time.

3 INVESTIGATIVE WORKS CARRIED OUT

3.1 The Council arranged for a diver to carry out an underwater inspection of the sheet piles. This revealed that the toe of the piles on the upstream side of the footbridge was undermined by approximately 300mm and that there was a

scoured trench along the river bed at the front of the piles along their complete length. The two ends of the piled wall were also open to the river and the upstream end was now showing visible signs of having rotated outwards at its top towards the river.

- 3.2** A 200mm diameter gas main is carried by the footbridge. A search of old records shows that Transco does appear to have Deed of Servitude to use the footbridge, but further legal investigations are being carried out. Transco advise that this is a strategic gas main that cannot be shut down.
- 3.3** On the downstream side of the footbridge two 250mm diameter water mains are supported by a separate pipe bridge structure. The pipe bridge support on the north banking comprises a large block of concrete, which is founded on the concrete slab on top of the currently intact section of sheet piles.. Preliminary investigations indicate that Scottish Water do not have permission from the Council to support their pipe bridge on the top of the sheet piled protection works. As a safety precaution Scottish Water have temporarily shut down the mains crossing the river. However, they advise that these are strategic mains, which link two separate water supply systems. Temporary problems in one supply system can be overcome by feeding water from the other.
- 3.4** Specialist Site Investigation work has been commissioned to determine the level of the foundations of the footbridge. This has revealed that the footbridge foundations are 2.2m above the present river bed level in front of the sheet piling. The face of the abutment is less than 3m from the sheet piling. It therefore sits in a perilous position and without protection it is open to scour from the river and possible future collapse.
- 3.5** A legal search has been carried out to determine ownership of the riverbank in the vicinity of the footbridge. This indicates that the Council own the land on which the footbridge is sited, along with the riverbank in the immediate vicinity. Protection of the riverbank is thus the responsibility of the Council.
- 3.6** The Huggin Craig Burn flows into the River Irvine immediately upstream of the footbridge, on the north bank. During inspection of the damage to the sheet piles it was revealed that a 12m long section of gabion basket protection to the north/east bank of the Huggin Craig Burn at its confluence with the river, had failed and collapsed into the burn. This has resulted in the burn flow being both restricted and moved closer to the sheet piles. It is considered that the collapse of these gabions may have been a contributory factor in the scour of the fill material behind the sheet piles, leading to their rapid collapse. These gabions were installed about 20 years ago by the adjacent householder to protect the property from erosion by the burn and the river.

4 ALTERNATIVE SOLUTIONS CONSIDERED

4.1 All solutions will require the removal of the failed sheet piling and the removal of the water pipebridge support. The site has difficult access for heavy construction plant and the need to work around the footbridge escalates the costs.

4.2 Scottish Water have engaged consultants to provide them with an alternative method of supporting their pipes which would remove the need to use the sheet piles.

4.3 OPTION 1 - Removal of the Footbridge.

This option would entail removal of the footbridge, abutments and gas main, followed by protection of the riverbank with armoured stone, (very large 1 to 3 Tonne boulders). Although the footbridge will require upgrading works in the long term, it is presently in a serviceable condition. Also, the gas main would almost certainly have to be supported across the river by some other means.

There are footbridges both upstream and downstream of this footbridge, all within a short walking distance. But the cost of removal together with protection of the riverbank would be £5,000 greater than the cost of leaving the bridge in place.

4.4 OPTION 2 - Retain the existing Footbridge and replace the sheet piles with new piling founded at a deeper level.

This option would be expensive and technically very difficult to carry out. Driving sheet piles, both beside and beneath the footbridge and utility services would be extremely difficult, if not impossible. There would also be the associated problem of noise and vibration from the piling operations.

4.5 OPTION 3 - Retain the existing Footbridge and replace the sheet piling with armoured stone.

This option would involve the removal of the sheet piles and the placement of heavy stone boulders to protect the abutment and the riverbank in the vicinity. This would involve difficult access to the river on both sides of the footbridge with large items of plant and heavy armour stone. The plant would then remove the sheet piling and place the armoured stone whilst still maintaining the integrity of the footbridge. It is anticipated that the gas main will remain on the footbridge whilst this work is ongoing. Discussions with Scottish Water would be required to agree a plan which would allow their works to be carried out in advance of the Council work, or indeed a joint venture may be feasible.

This option is considered to be the best solution. It would be a large and difficult engineering project, but should not present any insurmountable

technical difficulties and would be the least expensive option to make the bridge safe for the foreseeable future.

5. FINANCIAL IMPLICATIONS

- 5.1** The Council is liable for the repairs to the protection works which are estimated at £25,000 - £30,000. This could be met from the Committee's capital programme for 2003/04 depending on priorities.
- 5.2** The Council's Insurance Section is pursuing the possibility of an action to recover the costs from a third party.

6. LEGAL IMPLICATIONS

- 6.1** The maintenance of this footbridge, sheet pile protection works and the adjacent riverbank are the responsibility of the Council.

7. RECOMMENDATION

- 7.1** It is recommended that the Committee agree that remedial work to the sheet piled wall which protects the north abutment of the footbridge from river scour at Mure Place in Newmilns should be carried out in accordance with Option 3 set out at Para 4.5 above, subject to prioritisation in the Committee's capital programme for 2003/04.

Stephen Chorley
Director of Development Services

9 December 2002
SC/PL/AI/YK

LIST OF BACKGROUND PAPERS

Nil

For further information please contact Pete Longman on 01563 576310

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