No 72

Yorkshire Water Services

Remedial Works on Access Road to Silkstone STW

Feasibility Report

YWS Project No. A9402
Report No. 5000/0062-1A

April 06

SPEAK TO RUTH MARSDEN RE RIVERO

6/6/10

Watermark

SILKSTONE STW ACCESS-REMEDIAL WORKS

FEASIBILITY REPORT

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1. INTRODUCTION

Access from the public highway to the Silkstone STW is provided by a 3m wide, unnamed, unmade track, leading to the site from Silkstone Lane, approx. 400m to the west. The track is significantly potholed in places but other than the specific location that is the subject of this study it is generally in reasonable condition structurally. The track continues beyond the Works to provide an alternate access to a small number of properties and reconnects into the highway two miles to the north. Alternate access to the Works can also be achieved from this direction but involves significant additional mileage much of which involves track that is in poor condition and generally unsuitable for sludge tankers from both a practical and safety point of view.

The track is a designated bridlepath and as such has legal status as a public right of way. However there are few indications that it is used for this purpose, although this may be a consequence of its condition. Vehicular traffic is also extremely light, primarily provided by Yorkshire Water in the form of a part time operator and one tanker movement per week, together with access to one private property

2. DEFECT DETAILS

The primary hazard that is the subject of this report occurs at a point on the access track that lies immediately adjacent to a loop in the alignment of an adjacent watercourse, Banks Bottom Dike. The bed level of the Dike is 3.3m below the level of the track and the alignment of the watercourse is such that the bank is particularly susceptible to the direct action of flow particularly in high water level conditions. Consequent erosion has moved the bank towards the track to such an extent that at it nearest point the slope of the bank is approaching the vertical, with the top of the slope conflicting directly with the edge of the 'carriageway'. Any further erosion will directly impact the running lane but in the short term there is a significant and more immediate risk to vehicles using the track. The edge of the track adjacent to the eroded bank is inadequately restrained against lateral movement due to vertical loads and there is a substantial risk of local failure under wheel loading particularly from a loaded tanker. Because of the width of the track, potholed surface and the fact that it is battered from unprotected edges on both sides there is little scope for avoidance, and the degree of loading imparted is exacerbated by the uneven nature of the running surface.

Notwithstanding the possibility of carriageway failure the top of the bank is too close to the track and there is no margin for error in wet, muddy and potentially icy conditions.

3. REMEDIAL OBJECTIVES

The object of remedial work at this location would be to remove a hazard that poses a significant risk of injury/loss of life to Yorkshire Water operatives and/or the possibility of a pollution incident.

Remedial work required would be the reinstatement of the structural integrity of the access track and implementation of measures to reduce the effect of erosive forces, in conjunction with the introduction of direct safety features to protect vehicles against the residual hazard.

4. DESIGN CRITERIA/CONSTRAINTS

General

The access track is a designated bridle path although it is not clear how much dedicated use is made of it. It would not be practical to provide a local diversion without land entry arrangements and significant additional works. Proposed remedial options should therefore allow for the retention of sufficient width of track to maintain a safe horse/ pedestrian route through the site for the duration of the works.

Environment Agency

Any work in the watercourse will require the consent of the Environment Agency and it is possible that this may offer constraints in terms of acceptable options, wildlife protection, restricted periods etc..

Traffic Management

It would not be feasible to safely undertake any meaningful work at this location whilst maintaining full access to the track from Silkstone Lane, therefore authority for a closure of the right of way for all or part of the works would be sought from the appropriate authority. An alternate route is available, albeit via a significantly lengthy diversion, to access the other end of the track from the A635. Parts of this route are not in good condition but could be made acceptable for vehicles in the short term with low cost temporary improvements.

Private Parties

A small number of private properties can be accessed via the track, although the majority are located nearer to the alternate entrance and would probably not be affected. Those that are could be offered the same diversion as YWS vehicles.

5. CONSIDERED OPTIONS

Option 1: Realign Watercourse and Reinstate Batter

To excavate locally a revised channel for the watercourse to bypass the loop in the current alignment and facilitate the construction of an appropriate batter, extended into the former watercourse, to retain the carriageway.

Advantages

- Inexpensive but effective long term solution.
- Straightforward construction.
- Short construction period.
- Minimum requirement for skilled operatives.
- No 'unnatural' materials introduced to the site.
- Temporary flow control not required.
- Minimum loss to flooding during construction.
- Aesthetically maintains status quo.
- Avoids need to close the track for the full duration of the Works.

Disadvantages

- May possibly conflict with requirements of the Environment Agency.
- Requires extension of surface water outfall to revised location.

Option 2: Reinforced Concrete Retaining Wall

Excavation of eroded area and significant width of track, and construction of L-shaped cantilever retaining wall in reinforced concrete.

Advantages

- Effective long term solution.
- Flexibility in terms of location & alignment.

Disadvantages

- Significant excavation with temporary works required.
- Significant requirement for skilled operatives.
- Temporary flow control required during construction.
- Significant risk of damage and loss to flood during construction.
- Damage to or loss of mature trees.
- Parapet required.
- Significant change to the location aesthetically.

Option 3: Reinforced Earth Retaining Wall

Excavation of eroded area and significant width of track, and reconstruction in layers of fill wrapped in proprietary reinforcing fabric (eg. Netlon) with face staggered to a battered profile.

Advantages

- Effective long term solution.
- Flexibility to vary length with height and avoid loss/damage to trees.
- Stepped face profile to achieve 'natural' finish.
- Less intrusive aesthetically.
- Minimum requirement for skilled operatives.

Disadvantages

- Significant excavation and temporary works.
- Susceptible to flooding during construction.
- Measures to prevent subsequent erosion required.

Option 4: Gabion Retaining Wall

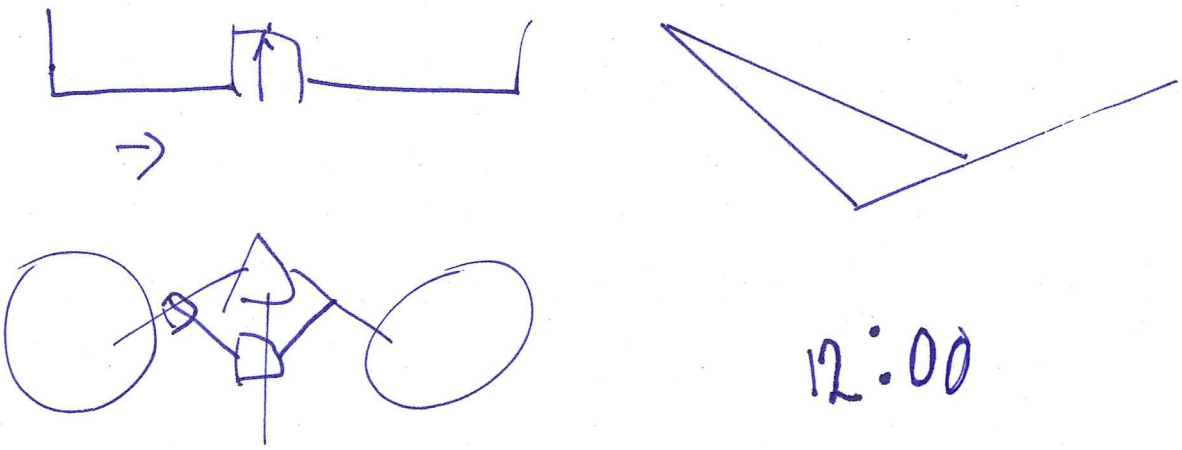
Excavation of eroded area and reduced width of carriageway, and reconstruction with rough filled gabion baskets stepped in towards the track to create a battered profile.

Advantages

- Effective long term solution.
- Some flexibility to vary wall length with height.
- Minimum requirement for skilled operatives.
- Effect of flooding during construction minimised.

Disadvantages

- Dubious aesthetic merit but less intrusive than concrete and facing away from main viewing direction.



6. RECOMMENDATION

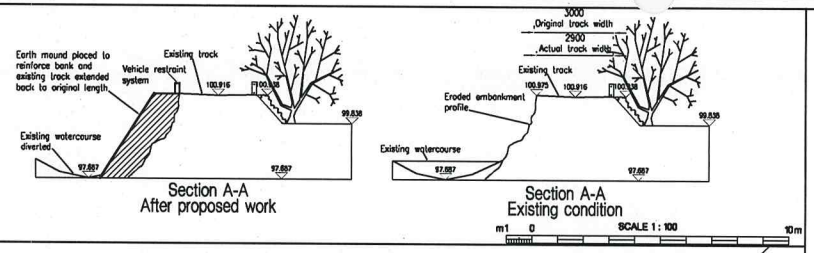
In the short term temporary measures should be implemented immediately to increase driver awareness of the hazard at this location by means of signing and temporary fencing.

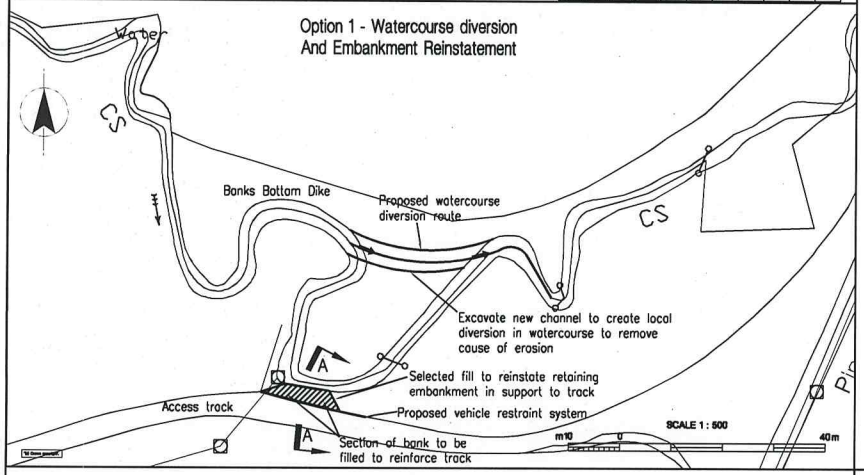
As a long term solution and in consideration of the options outlined in para. 5 above it is suggested that in this particular situation Option 1 would for the reasons stated provide an effective solution that is also the most cost effective. Topographically this option upsets the status quo slightly, but environmentally involves no loss of habitat, and retains a natural environment without the introduction of any unnatural features or materials.

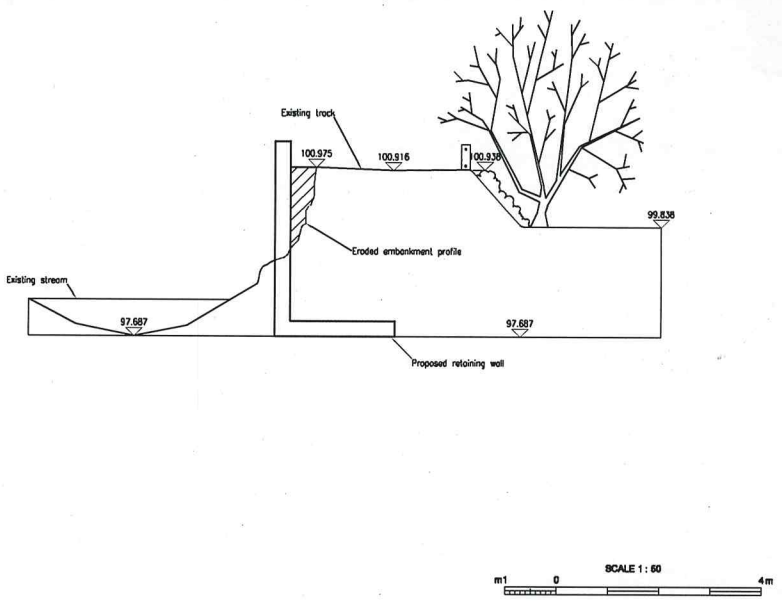
It is also recommended that the chosen structural solution should be reinforced by including repairs to the potholes in the track, and incorporating the erection of an Armco type protective barrier through the area of risk.

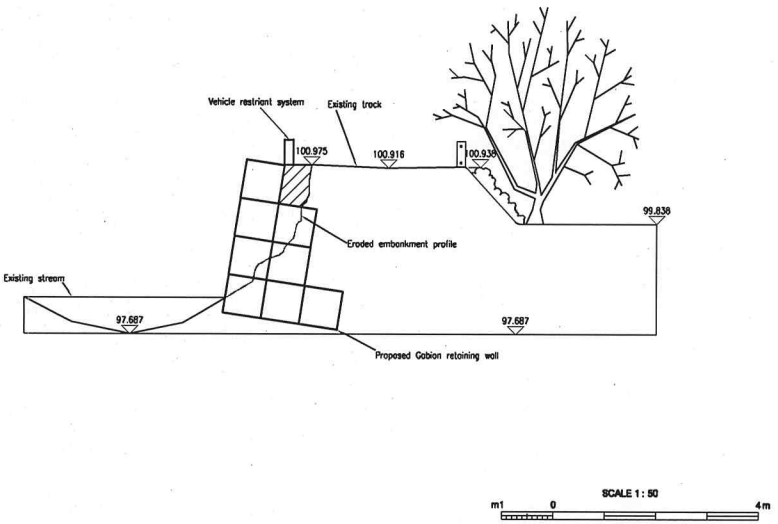
7. APPENDIX A

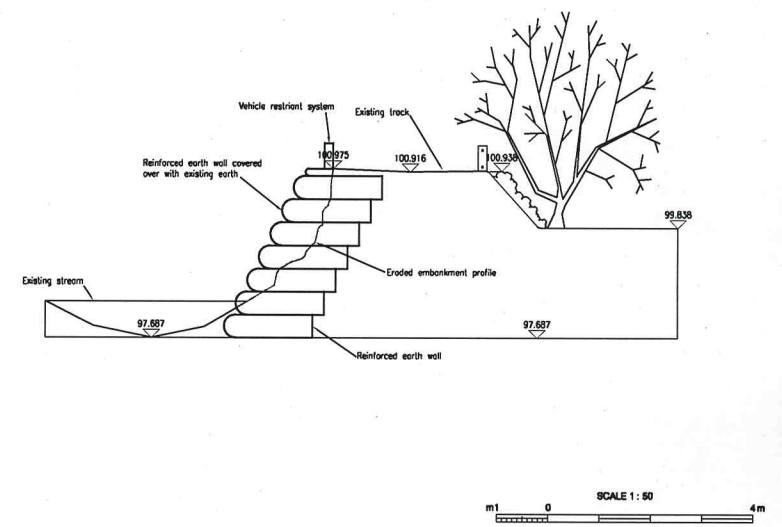
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NOTES

1. All dimensions in millimetres and all levels in metres A.O.D. unless otherwise shown
2. Works to be completed in accordance with Yorkshire Water Engineering Specification and Guidance Notes Version 7 dated 2004.

Existing sewer and manholes

CURRENT ISSUE INFORMATION

DATE	DRWN	CHKD	REVD	ISSUE

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