

Technical Note

Project: Bus Rapid Transit - Ashton Vale to Bristol City Centre	To: Rob Thompson
Subject: Brunel Way Ramps	From: Craig Twyman
Date: 27/8/08	cc: Kathryn Waring

1. Introduction

The West of England Partnership is considering a number of bus rapid transit (BRT) routes through Bristol and Bath. Atkins Transport Planning has been commissioned by the Partnership to undertake preliminary design and capital works cost estimates.

This Technical Note considers the Ashton Vale to Bristol City Centre BRT route, in particular an alternative link which would run north of the Floating Harbour, rejoining the proposed southern alignment of the BRT route via Avon Bridge and Brunel Way. Figure 1 overleaf shows the options that have been identified for these tie-ins. Brunel Way (see photo 1) is a dual carriageway viaduct between the River Avon and Clift House Road. The preferred blue route passes under Brunel Way and crosses the river using the existing Ashton Avenue Bridge. The alternative (green, orange and pink routes) would require new ramps to take buses to/from the Brunel Way viaduct and over the existing Avon Bridge.

Atkins Transport Solutions has been asked to produce an Order of Magnitude works cost estimate for the new ramps. This Technical Note summarises the cost estimate and significant issues associated with the works.

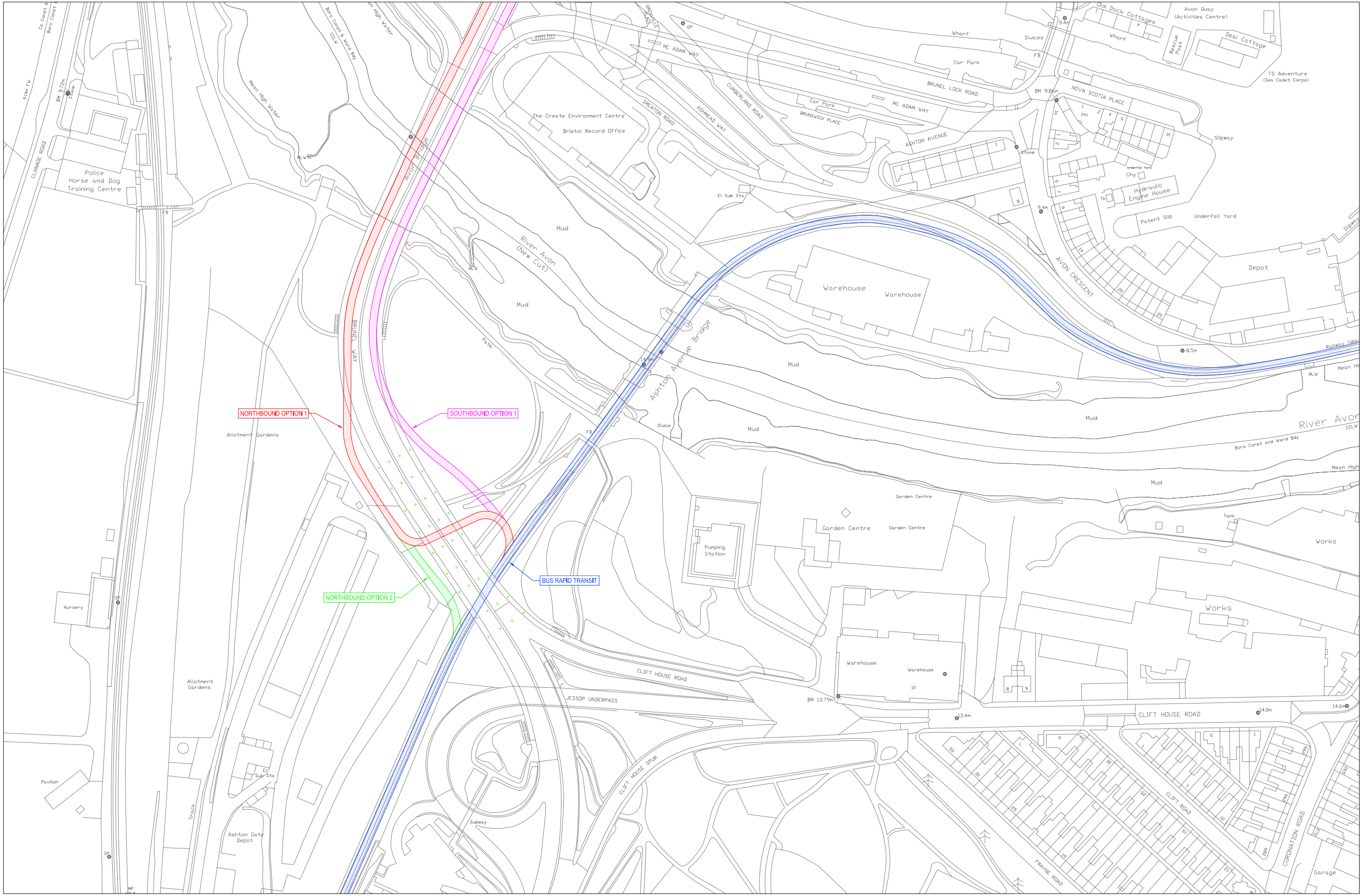


Photo 1: Brunel Way viaduct looking north east towards the Clifton Suspension Bridge

DO NOT SCALE



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P	FEASIBILITY REPORT								

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Client
BRISTOL CITY COUNCIL
 Project
GREATER BRISTOL RAPID TRANSIT

Title
**FIGURE 1
 GENERAL ARRANGEMENT**

Sheet Size A3	Original Scale 1:2000	Designed/Drawn GV	Checked	Authorised
Status P	Drawing Number 5056525/001	Date 18/08/08	Date 27/08/08	Date 27/08/08
				Rev A

2. Cost Estimate

2.1 Cost Estimate Summary

The total capital works cost estimate for providing northbound and southbound ramps is **£650,000** as shown in Table 1.

Northbound option 1	Northbound option 2	Southbound	Total northbound + southbound (approx)
£350,000	£345,000	£300,000	£650,000

Table 1: cost estimate summary

The above cost estimate is inclusive of traffic management and preliminaries but exclusive of optimum bias. As only an outline design has been produced, it is recommended that an optimum bias figure in the region of 50% would be appropriate. A further breakdown of the cost estimate is provided below.

2.2 Cost Estimate Breakdown

A further breakdown of the capital works cost estimate is provided in Table 2 with assumptions stated in the sections that follow.

Route	Ramp (£)	At-grade Track (£)	Interface with Brunel Way (£)	Services (£)	CPO (£)	Total
Northbound option1	150,000	100,000	50,000	50,000	0	£350,000
Northbound option 2	150,000	85,000	50,000	50,000	10,000	£345,000
Southbound	150,000	50,000	50,000	50,000	0	£300,000

Table 2: cost estimate breakdown

2.2.1 Ramps

It is assumed that ramps would be built on supports rather than fill embankments to match existing viaducts in the area. Although earthworks might be less expensive, they would create drainage issues especially in the event of a flood. They would also sever pedestrian and cyclist access through the area. The ramps are assumed to be 50m long, roughly corresponding to a 1:20 gradient between Brunel Way viaduct and existing ground level.

For costing purposes, the ramps are treated as simple bridges with a rate of £3,000/m² as identified on previous Atkins bridge projects. The proposed structures are assumed to have piled foundations as the ground conditions are unknown.

2.2.2 At-grade Track

The at-grade tracks connecting the blue route to the ramps are assumed to be 4.5m wide paved carriageway. The at-grade tracks lengths for northbound option 1, northbound option 2 and the southbound option are approximately 100m, 85m and 50m, respectively. The assumed rate is £1,000/m² based on rates derived during Atkins' Hengrove to Bristol City Centre BRT study.

2.2.3 Interface with Brunel Way

There are interface issues where the new ramps would connect to the existing Brunel Way viaduct. The parapets and footways, visible in photo 2, would have to be removed and partially reinstated. The cantilevered section of deck, visible in photo 3, would likely have to be strengthened. A lump sum of £50,000 per direction has been assumed for these works.



Photo 2: view along southbound parapet and footway



Photo 3: view along southbound viaduct cantilever

2.2.4 Services

Statutory undertaker services are known to be present in the viaduct footways, as shown in photo 4. The cost for diverting services could range significantly. A lump sum of £50,000 per footway has been assumed.

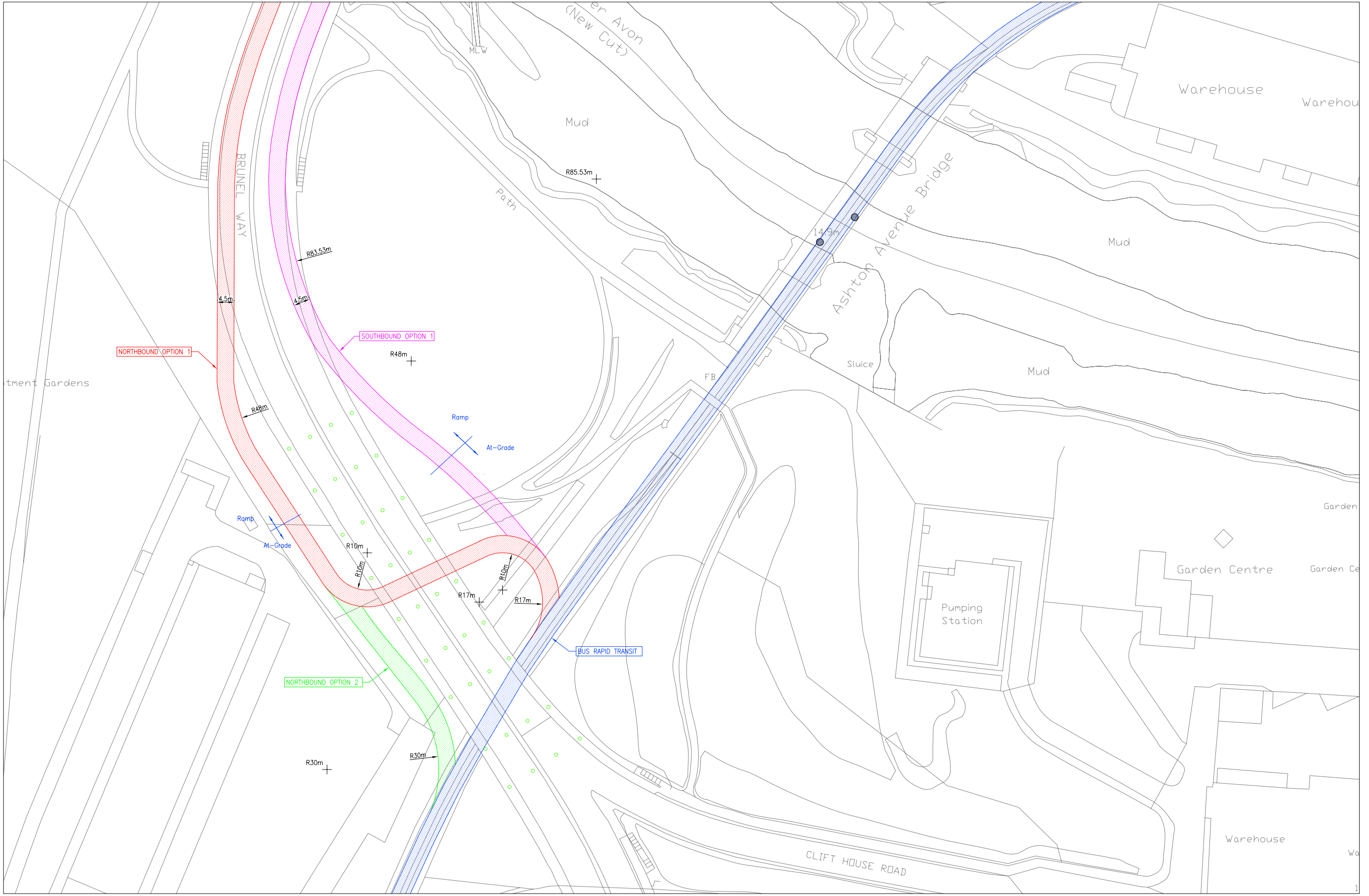


Photo 4: an example of services in the viaduct footway

2.2.5 Compulsory Purchase Order (CPO)

Figure 2 overleaf shows the geometric details of the proposed ramps. Northbound option 2 would likely cross a small corner of land that is assumed to be privately owned. A lump sum of £10,000 has been assumed for compulsory purchase of this land. The difficulties in acquiring such land should be considered when assessing the viability of northbound option 2.

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Client	BRISTOL CITY COUNCIL
Project	GREATER BRISTOL RAPID TRANSIT

Title		FIGURE 2 GEOMETRICAL DETAILS			
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A3	1:1000	GV			
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3. Additional Considerations

3.1 Geometry

Northbound option 1 follows a minimum radius curve of 10m. This can only be achieved by the bus slowing down to less than 5mph on the horizontal curves. More gradual curves are not readily achievable within the given land and existing structure constraints. The headroom where northbound option 1 passes under Brunel Way (see photo 5) is approximately 4.5m. This may exclude double decker buses from using this route.



Photo 5: view under Brunel Way looking north east towards Ashton Avenue Bridge

3.2 Aesthetics and Environment

The proposed ramps would be large, unsightly structures that add to existing clutter in the area. Visual intrusion would be significant. The northbound options would require extensive vegetation clearance likely to include the requirement to remove several mature trees. The local ecology is unknown and an ecological survey would be required to identify whether protected species are present.

3.3 Traffic Disruption

The works would require lane closures on Brunel Way while the ramps are tied into the existing viaduct. The closures would be required for several weeks causing significant disruption to the city centre.