

Update on Swing Bridges
Report by Asset Officer

Summary: This report details the current position regarding the Network Rail bridges for member's information.

Members' views are sought on the design dimensions as set out in Table 1 at Section 2 to provide further advice to Network Rail during the options development.

1 Background

- 1.1 There is a statutory obligation for all opening bridges crossing the navigation to open on demand to allow free passage to vessels that would otherwise be obstructed. In the past Network Rail has been non-compliant in these obligations in part by not informing the Broads Authority regarding bridge failure and in particular by mis-communicating deadlines for repair.
- 1.2 There has been a long catalogue of incidents over the last five years, usually resulting from poor maintenance or failure of parts that cannot be easily replaced and for which no spares were held. The problems have been further compounded by Network Rail's non-adherence to previously agreed guidelines and requests, no or poor communication and subsequent negative press for the Broads Authority.
- 1.3 On 17 September 2010 the Broads Authority received a position report on negotiations with Network Rail regarding the operation of Somerleyton, Trowse and Reedham bridges. The Report included advice from Counsel regarding the terms to be included within a proposed undertaking between the Authority and Network Rail. The undertaking was subsequently agreed and signed on 23 March 2010.
- 1.4 The undertaking clarifies the requirements falling on Network Rail to use its best endeavours to have the bridges operational for opening and closing on demand, except when trains are moving or during planned maintenance work. This provides the basis for the Authority to seek an injunction requiring compliance with its statutory duty to open on demand, and the other aspects of the undertaking, should there be any material non-compliance with the terms of the undertaking.

2 Current position

- 2.1 Communications are greatly improved since the undertaking. The Broads Authority is now advised on a daily basis regarding the status of each bridge.

Any interruptions to service are then placed on the Broads Authority website, emailed to the Notice to Mariners contact list and placed on Twitter to alert the public on the current issue immediately. Network Rail also paid for a special edition of the Broadsheet in June 2011 in order to communicate the current status and their commitment to the bridges. Regular liaison meetings are held between the two organisations and commitments tracked through action points.

- 2.2 In recognition of the unreliable record and issues with the operation of their bridges, the Broads Authority proposed that mitigation measures were required to assist boaters, and so Network Rail has paid for de-masting pontoon moorings at Reedham (46m) and Somerleyton (69m) bridges at a cost of £71,625 which were installed by the Authority. They have also contributed £14,000 towards the dredging operation near the bridges at Thorpe Green in honour of a previous agreement established by the Port and Haven Commissioners.
- 2.3 Additionally, following pressure to improve the communications to boaters at each bridge, Network Rail are installing electronic signage at a cost of £160,000 to aid communication to the boating public. The proposed electronic signage at Trowse, Reedham and Somerleyton is due to be delivered to Network Rail on 28 June 2013 with installation taking place at the bridges shortly after that date. The signs will be able to indicate if the bridge is operable and how long boaters will have to wait for the next swing.
- 2.4 Recent works undertaken by Network Rail include 3.7 million refurbishment of Oulton Broad in June 2009, with a further £47,000 for a new drive shaft and modifications in November 2012. They have currently spent £250,000 on the software and hydraulic issues at Trowse and this will obviously increase due to the need to procure a new contractor regarding the issues they are currently unable to resolve.
- 2.5 As part of the ongoing liaison meetings between the two organisations which is now undertaken at Chief Executive/Director level, Network Rail has committed to undertake detailed monitoring of both Reedham and Somerleyton bridge and to commission a whole life management (120 years) study for the two bridges.

3 Whole Life Management Strategy Study

- 3.1 Network Rail have installed a detailed scheme of monitoring sensors (November 2012) on both Reedham and Somerleyton bridges and these will run for approximately 12 months and feed into the commissioned report.
- 3.2 Network Rail has appointed Mott MacDonald to undertake a feasibility study at a substantial cost to enable a whole life management strategy to be determined for Reedham and Somerleyton bridges. The study considers all relevant disciplines, affecting the structure and its operation. The project requirements specification highlights a number of possible strategies available for the future of the asset, from maintenance to complete renewal. The

purpose of the study is to establish whole life costs for the options, along with aspects such as reliability and disruption, to allow their comparison and eventual selection of a preferred option to be taken forward to the next stage of the process.

- 3.3 The draft report and findings were presented in confidence by Mott MacDonald to Network Rail and the Broads Authority officers on 25 February 2013. The report summarises the initial development of feasibility options for the refurbishment or renewal of Reedham and Somerleyton bridges. The options will in due course be compared on a whole life cost basis, the key driver in the options being to achieve improvements in operational reliability.
- 3.4 The scheme options being investigated, with sub options are:
- Option 1 – Renewal with new movable bridge
 - Option 2 – Renewal with fixed flyover
 - Option 3 – Refurbishment in-situ
 - Option 4 – Refurbishment off-line using temporary fixed bridge
 - Option 5 – Do minimum piecemeal maintenance
- 3.5 Whole life costing – high level estimates of the key cost differentiators for the renewal options have been calculated including commuted sums for maintenance and operation through the life of the new structure. At this stage costs are high level point estimates and exclude any risk contingency. The costings currently exclude any necessary land purchase, service diversions, demolitions, design, planning, possessions, Network Rail costs, or ancillary structures.
- 3.6 A summary of the findings from the report are detailed in the tables below:

Table 1

Reedham Bridge Options – existing air draft 3.05m, width 16.6m						
	Option	Key features	Capital /Life cost	Pros	Cons	General Navigation comments
Option 1 – New movable	New bascule	– 15m clear width – 4m airdraft when closed	£24m	– No air draft limit – Reliable movable bridge	– Clear width – collision risk – Construction affects navigation – Fendering and jetty requirements	With regards to clear width – no further restriction at Reedham would be acceptable
	New bascule with counterweight	– 22m clear width – 4m airdraft when closed	£28m	– No air draft limit – Betterment to clear width	– Construction affects navigation – Fendering and jetty requirements – Greater visual impact	22m would facilitate future freight option As the local planning authority the Broads Authority will also need to have regard to the possible landscape
	New offline	– 15m Clear	£28m	– No air draft	– Two stage	

	swing bridge	width – 4m aircraft when closed		limit	operation – Higher cost – Clear width – collision risk – Construction affects navigation – Fendering and jetty requirements	impacts of any new structure
	New moveable bridge on existing substructure	– 15m clear width – 3m aircraft when closed – Reuse existing pier	£20m	– No air draft limit – Lower cost renewal	– Suitability of existing foundation – Disruption to railway – Two stage operation – Construction affects navigation – Fendering and jetty requirements	If a moveable bridge were considered at a slightly higher level e.g. 5m the number of swings is likely to be vastly reduced and may offer savings

Fixed	Fixed flyover (5m aircraft)	– 5m aircraft – Constrained by land availability	£20- >£50m	– Low maintenance – Low impact on railway – Low cost renewal	– Air draft not acceptable to BA – Greater visual impact	Would need to be of sufficient height to allow coasters but could possibly be acceptable at height lower than 20m bearing in mind that majority of yachts can lower masts
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Options 3 -5 Refurbishments	In situ	– Refurbished on site 2- two stage	17m	– Lower cost – Address key defects	– Subject to monitoring findings – x 2 week track blockades – 6 months – no swinging	Disruption to navigation during the works period
	Offline	– Transported off site – Temporarily fixed bridge – New slewing bearing	20m	– Allows more extensive works – Greater improvement to reliability of existing bridge	– Subject to monitoring findings – x 2 week track blockades – 6 months restricted headroom (reduced 0.5m)	Significant disruption to navigation during the works period
	Piecemeal maintenance	– Do minimum	21m	– Low capital cost	– Subject to monitoring	Likely to have continued reliability issues

		to maintain operation			findings – May not be feasible	
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Somerleyton Bridge Options – existing air draft 2.6m, width 16.4m						
	Option	Key features	Capital /Life cost	Pros	Cons	Navigation comments
Option 1 – New movable	New bascule	<ul style="list-style-type: none"> – 15m clear width – 3-4m airdraft when closed 	£25m	<ul style="list-style-type: none"> – No air draft limit – Reliable movable bridge 	<ul style="list-style-type: none"> – Construction affects navigation – Landtake and TWA order (~£3m) 	As the local planning authority the Broads Authority will also need to have regard to the possible landscape impacts of any new structure. Agreed 15m clear width ok
	New offline swing bridge	<ul style="list-style-type: none"> – 15m Clear width – 3- 4m airdraft when closed 	£30m	<ul style="list-style-type: none"> – No air draft limit 	<ul style="list-style-type: none"> – Two stage operation – Higher cost – Construction affects navigation – Land take and TWA order (~£3m) 	
	New swing bridge on existing substructure	<ul style="list-style-type: none"> – 15m clear width – 3m airdraft when closed – Reuse existing pier 	£20m	<ul style="list-style-type: none"> – No air draft limit – Lower cost renewal – No land take or TWA 	<ul style="list-style-type: none"> – Suitability of existing foundation – Disruption to railway – Two stage operation – Construction affects navigation 	If a moveable bridge were considered at a slightly higher level e.g. 5m the number of swings is likely to be vastly reduced and may offer savings in terms of wear and tear, operational issues etc.
	New on-line moveable bridge	<ul style="list-style-type: none"> – Significantly increased clear width – 3m airdraft when closed – Slide into existing alignment 	>£30m	<ul style="list-style-type: none"> – No air draft limit – No land take or TWA 	<ul style="list-style-type: none"> – Complicated construction – higher risk – Higher cost – Disruption to railway – Construction affects navigation 	
Option 2 – Fixed	Fixed flyover (5m airdraft)	<ul style="list-style-type: none"> – 5m airdraft 	£25m	<ul style="list-style-type: none"> – Low maintenance – Low impact on railway 	<ul style="list-style-type: none"> – Air draft not acceptable to BA – Land take and TWA order 	The lowest fixed height which may be acceptable would be the same as Haddiscoe Flyover (7.3m)
	Fixed flyover (7.3m airdraft)	<ul style="list-style-type: none"> – 7.3m airdraft 	£29m	<ul style="list-style-type: none"> – Low maintenance – Low impact on railway – Matches Haddiscoe 	<ul style="list-style-type: none"> – Land take and TWA order – Visual aspect 	

				air draft		
	Fixed flyover (7.3 aircraft) North side		~30m	<ul style="list-style-type: none"> – Avoids land take and TWA application 	<ul style="list-style-type: none"> – Less straightforward – higher risk/cost – Visual impact – Disruption to railway 	
Options 3 -5 Refurbishments	Insitu	<ul style="list-style-type: none"> – Refurbished on site – 2- two stage 	17m	<ul style="list-style-type: none"> – Lower cost – Address key defects 	<ul style="list-style-type: none"> – Subject to monitoring findings – x 2 week track blockades – 6 months – no swinging 	Disruption to navigation during the works period
	Offline	<ul style="list-style-type: none"> – Transported off site – Temporary fixed bridge – New slewing bearing 	20m	<ul style="list-style-type: none"> – Allows more extensive works – Greater improvement to reliability of existing bridge 	<ul style="list-style-type: none"> – Subject to monitoring findings – x 2 week track blockades – 6 months restricted headroom (reduced 0.5m) 	Significant disruption to navigation during the works period, air draft would be reduced to Vauxhall bridge level
	Piecemeal maintenance	<ul style="list-style-type: none"> – Do minimum to maintain operation 	21m	<ul style="list-style-type: none"> – Low capital cost 	<ul style="list-style-type: none"> – Subject to monitoring findings – High ongoing maintenance cost – Reliability risk 	

4 Next steps

- 4.1 Following the presentation of the study in February this year, where navigation related key constraints were detailed, the time table for future actions and the way forward have now been set by Network Rail. The project programme is at table 2.

Table 2

	2012					2013												2014	
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Establishment																			
Site																			
Investigations																			
Monitoring scheme installation																			
Monitoring period																			
Draft Options report																			
Final Options report																			
Single Option review and agreement																			

- 4.2 Members views are sought on the outline options shown in Table 1, in particular with reference to the proposed design dimensions. It is also proposed that a further report with a presentation by Network Rail be brought back to the Committee during the Final Options report review, in order to advise further prior to the preferred option being selected.

5 Update on Trowse Bridge

- 5.1 From October 2003 to February 2013 Trowse Bridge has been operational 1591 days and has failed 1852 days. Recent issues that have been rectified include installation of a new computer system, the main valves that drive the jacks scarfe joints, a new proximity switch, and the replacement of hydraulic pipes and oil.
- 5.2 Network Rail has informed the Authority that the current testing has been exhausted without achieving reliable operations of the bridge. Expert outside contractors are now being sought to rectify the reliability problems.
- 5.3 Due to the fact that the bridge has been out of action for some considerable time Network Rail have agreed that it is willing to swing the bridge manually by bringing in Plant staff when required. Due to the frequency of London trains and the time it takes to operate a swing manually the bridge can be opened on a Sunday at 09:05 and any night between 02:00 – 04:00 provided seven days notice has been given to allow for Plant staff to be on site.
- 5.4 Openings within these times can be arranged by contacting Network Rail through their Area Incident Control Centre. This is manned 24/7 and they will then pass on the request to the Ipswich Distribution and Plant team for a response. Telephone 02079 793609, Email CO-ANG-EAH-11A@networkrail.co.uk .

6 Conclusion

- 6.1 Since the signing of the undertaking in March 2010 and the commitment to making their “best endeavours” to having the bridges operational, Network Rail has allocated a large budget and made considerable efforts to improve the position regarding bridges in the Broads Authority area. Officers will continue to apply pressure for Network Rail to resolve all outstanding issues.

Background papers:	None
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Broads Plan Objectives:	NA5.1/ NA 5.3
Appendices:	None