SURREY
COUNTY COUNCIL

RESTRICTIONS ON ALBANY BRIDGE, ESHER

SURREY COUNTY COUNCIL
LOCAL COMMITTEE (ELMBRIDGE)

26 MARCH 2007

KEY ISSUE:

Restrictions on Albany Bridge, Esher

SUMMARY:

The restriction on the bridge is to prevent traffic using the weak areas of the bridge. It is likely that the bridge will require substantial strengthening or reconstruction in the future and the restrictions will need to remain in place until this is complete.

OFFICER RECOMMENDATIONS:

The Committee is asked to note the contents of the report.

For information only

1. INTRODUCTION and BACKGROUND

1.1 Albany Bridge is a single span bridge which carries the A244 over the River Mole to the west of Esher. It was built in 1966. The bridge deck and abutments (supports) are made from post tensioned concrete. Post tensioning is a method of increasing the strength of the concrete sections following erection. However, this means that it relies on tensioned steel cables for its structural integrity.

1.2 Several failures of such bridges have occurred in the UK and abroad and this type of design means that when failures occur they are very sudden. This type of bridge was not allowed to be used for some time in the early 1990s after the collapse of Ynsygwas bridge in Wales which also carried a public highway. A national investigation programme was undertaken to determine the condition of post tensioning system. This testing was carried out at Albany Bridge in 1997 and found no significant deterioration in the areas investigated at that time.

2. ANALYSIS and COMMENTARY

2.1 A strength assessment of the bridge was carried out in 2006. This involves checking the design of the bridge using current standards. Changes in loading standards are particularly relevant. Permitted weights of vehicles allowed on the roads have steadily increased over the last 40 years and the current maximum weight is 40t/44t compared with 28t/32t in 1967. The strength assessment found that the edges of the bridge deck at the kerb lines were only capable of carrying 7.5t vehicles.

2.2 When a bridge fails a strength assessment it is necessary to apply a restriction to protect either the weak area or the whole bridge. A weight restriction was considered inappropriate in this case because of the lengthy diversion route and the environmental implications of heavy vehicles possibly using inappropriate routes. It was therefore decided to protect the weak areas of the bridge using barriers which are currently in place. Abnormal loads (those over 40t/44t) are prohibited from using the bridge.

3. CURRENT WORK

3.1 Strength assessment is carried out in stages. The results so far are from the ‘Stage 1’ assessment which uses the simplest analysis techniques and gives a conservative answer in many cases. If the bridge passes at this stage no further work is necessary. If the bridge fails at this stage the assessment progresses to ‘Stage 2’. This stage uses specialised mathematical techniques to model the behaviour of the bridge. In many cases this will produce a better result. We are currently carrying out this work.

3.2 The inspection of the post tensioning system was carried out in 1997. We will be carrying out additional investigation to determine if there has been any deterioration in the last ten years. The information from this

investigation will also be used to determine if the assessment result needs to be reduced because of deterioration.

4. FUTURE OUTLOOK

4.1 The result of the further assessment work should be available by the end of April this year. It is unlikely that the overall result for the bridge will improve to allow full highway loading. However, the assessment will give us a better understanding of the behaviour of the bridge under loading which could allow the barriers to be moved sufficiently to accommodate two lanes of traffic in each direction.

4.2 We are also investigating the possibility of using advance techniques to further improve our understanding of the bridge behaviour. These include load testing and continuous monitoring. Load testing involves applying a vehicle load under controlled conditions and measuring the actual stress in the bridge. Continuous monitoring involves installing sensors which constantly monitor for breaks in the reinforcing cables. Load testing costs £ 20000 to £ 30000 and monitoring around £ 100 000 with ongoing maintenance costs. These techniques will be used to manage the bridge pending strengthening or reconstruction.

5. STRENGTHENING/RECONSTRUCTION

5.1 Any strengthening or reconstruction of this bridge will be particularly difficult. It is not always possible to devise a strengthening for this type of structure particularly when the theoretical capacity is as low as 7.5t. Strengthening of this bridge may only delay the eventual need for reconstruction. There are other maintenance issues associated with the structure, particularly water penetration, which are almost impossible to resolve and will eventually lead in themselves to reconstruction.

5.2 Any reconstruction will need to consider the difficult location as well as the statutory undertakers plant contained in the bridge. It would need to take place while maintaining traffic flow. Gas, electric, water, telecoms and a government pipeline are contained in the edges of the bridge. It is likely that any reconstruction scheme would take three to five years to reach construction stage.

6. SUMMARY

6.1 It is unlikely that the current assessment work will result in the capacity of the bridge being increased to 40t/44t. It is estimated that reconstruction will take three to five years to reach site. We may be able to improve the traffic situation in the meantime.

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BACKGROUND PAPERS: **None**