

CAMBRIDGESHIRE GUIDED BUSWAY DEFECTS

To: **General Purposes Committee**

Meeting Date: **29th November 2016**

From: **Executive Director, Economy, Transport and Environment**

Electoral division(s): **All**

Forward Plan ref: **2016/040** *Key decision:* **Yes**

Purpose: **To consider expert technical and legal advice regarding the rectification of defects in the construction of the Cambridgeshire Guided Busway and the recovery of costs from the contractor Bam Nuttall.**

Recommendation:

The General Purposes Committee is asked to:

- a) **Note the advice of the Council's expert technical advisers regarding the causes of, and options, for rectification of the defects as set out in the report and Appendices A, and B.**
- b) **Note the advice of Mr Stephen Furst QC regarding the Council's legal remedies and assessment of the strength of case, as set out in confidential Appendix C.**
- c) **Resolve to carry out works to rectify all of the superstructure, foundation and drainage defects in accordance with the assessment of the Project Manager and the advice of the Council's expert technical advisers, subject to securing funds from Bam Nuttall in accordance with the defect provisions in the construction contract or alternative legal argument.**
- d) **Instruct Officers to initiate negotiations and any necessary legal proceedings to recover the assessed cost of defect correction in accordance with the contract, consequential losses arising from those defects, and any costs incurred to date and incurred in future in investigating and taking advice on the defects.**
- e) **Note that in the event that a settlement is not reached and it is necessary to pursue the matter through the courts the estimated costs of legal action will exceed the amount remaining in the specific reserve and agree that any additional costs should be met from the general reserve.**

<i>Officer contact:</i>	
Name:	Bob Menzies
Post:	Director, Strategy and Development
Email:	Bob.menzies@cambridgeshire.gov.uk
Tel:	01223 728368

1. CONFIDENTIALITY

- 1.1. This report contains confidential advice within a separate appendix (**Appendix C**). This advice is subject to litigation privilege. If Members wish to discuss this advice then it will be necessary for the meeting to be held in closed session.

2. PURPOSE

- 2.1. General Purposes Committee on 7th October 2014 considered a report on Busway Defects <http://tinyurl.com/GPC-Committee-Report> (agenda item 7) and
 - i. Resolved to carry out works to rectify all of the superstructure, foundation and drainage defects in accordance with the assessment of the Project Manager and the advice of the Council's expert technical advisers, subject to securing funds from Bam Nuttall in accordance with the defect provisions in the construction contract or alternative legal argument.
 - ii. Instructed Officers to initiate negotiations and any necessary legal proceedings to recover the assessed cost of defect correction in accordance with the contract, consequential losses arising from those defects, and any costs incurred to date and incurred in future in investigating and taking advice on the defects.
- 2.2. GPC were also advised of discussions with BAM Nuttall regarding further investigations into the defects. These investigations have now been completed.
- 2.3. The purpose of this report is to consider the revised expert technical and legal advice regarding the rectification of defects in the light of the investigations and to reconfirm the actions to be taken to rectify the defects and recover the costs from the contractor BAM Nuttall.
- 2.4. The report is structured as follows: background, the defects and new information arising from the investigations, the costs and options for rectification, the expert's opinion, meetings with BAM, the costs of action, and a summary of the position.

3. BACKGROUND

- 3.1. Following the completion of the Cambridgeshire Guided Busway in April 2011 the County Council took legal action to recover money owed by the contractor BAM Nuttall. The dispute over the final cost of the Busway was settled in September 2013 when the Council agreed to accept a settlement from Bam Nuttall.
- 3.2. The settlement included payment for these defects that were known about at the formal contract completion date with three exceptions. These three defects were excluded from the settlement because at the time the full extent of their impact could not be quantified. These defects were 'stayed' in legal parlance; that is the legal action was put on hold for future resolution.

- 3.3. Since completion of the Busway a number of other defects have come to light; most noticeably the movement of the bearing pads on which the guideway beams rest. This has resulted in a number of instances of 'steps' appearing in the guideway. Bam Nuttall have failed to address this or any other defect notified since completion.
- 3.4. Following the decision by GPC in October 2014 a Letter of Claim was sent to BAM Nutall on 11th December 2014 setting out the basis of the Council's claim. Bam Nuttall responded by denying that there were any defects but also by proposing that a programme of investigations be undertaken, to which proposal the Council agreed in early 2015. A legal claim has not been commenced pending the outcome of the investigations. It was considered advisable to agree to BAM Nuttall's proposal for joint investigation both in the expectation that it would provide greater information and would be in compliance with the Pre-Action Protocol for Construction and Engineering Disputes which requires the parties to seek to resolve their differences other than through court action.
- 3.5. The Council has continued to take legal advice from Mr Stephen Furst QC, and independent advice on both the technical issues and valuation or quantum of the costs involved. Technical advice in respect of the concrete guideway has been provided by Mr Tony Cort and advice in respect of foundations and drainage by Mr Robin Sanders, both of Capita. Valuation advice has been provided by Mr Chris Ennis of Time Quantum Expert Forensics Limited.
- 3.6. Mr Cort and Mr Sanders have advised on the joint investigations programme and all of them have now provided revised technical advice attached in **Appendix A**. Mr Furst's further advice is attached in confidential **Appendix C**, and the valuation advice as **Appendix B**. Legal and technical advice has only been taken in respect of defects with an estimated assessed value of £50,000 or more, in order to limit costs.

4. THE DEFECTS AND THE INVESTIGATIONS

- 4.1. The principal problems with the Busway are that:
- Vertical and horizontal steps have developed at the joints between the precast track sections or 'ladders'
 - The foundations of the guideway are moving differentially; and
 - The concrete of the guideway is spalling (slivers of concrete breaking off corners) in numerous locations
- 4.2. Details of the defects are set out in the attached advice.
- 4.3. Following the discussions with BAM a programme of investigations was agreed and procured from specialist contractors. Some of the investigations produced results that required further investigations and the agreement of additional investigations. This has led to the process taking longer than anticipated.
- 4.4. The results of the investigations have led to Capita modifying their views regarding the mechanism by which the steps appear in the guideway. The primary cause of this is that the neoprene bearing pads and the plastic shims

which support the ladder beams on the foundations are not restrained other than by surface friction and become displaced allowing the ladder beam ends to drop. In addition to the issues previously identified of lack of sufficient friction, thermal expansion and contraction and the dynamic loading of buses, the investigations have identified that the ladder beams are excessively stiff and thus do not flex to take up settlement of the foundations. As a result even the smallest differential settlement of the foundations reduces the load on the bearings and thus the friction that restrains the bearings in place.

- 4.5. This is contrary to BAM Nuttall's design which assumed a level of flexibility to deal with minor settlement within the overall specified tolerances. Thus in addition to the inadequacy of BAM Nuttall's bearing design their design of the guideway ladders is incompatible with their foundation design.
- 4.6. The investigations have also established that the lateral restraint brackets fail to prevent sideways movement at a fraction of their design load, thus explaining the horizontal steps between guideway beams.
- 4.7. The investigations included walkover and level surveys of the guideway. This established that at the time of the survey 3.9% of the 5612 guiderails joints had vertical steps of more than 2mm and 11% had horizontal displacements of more than 2mm.
- 4.8. In Bam Nuttall's design the longitudinal movement of the beams should be constrained by metal brackets bolted to the foundations and restraining the cross members at every other joint. This being a 'fixed' joint. The other end of each beam being free to take up thermal movement at the alternate 'free' joints. It has been found that neither the brackets nor the cross members are sufficient to resist longitudinal forces and there is evidence of both having moved.
- 4.9. There is also evidence of lateral (sideways) movement of the guideway. The Works Information requires the guideway beams to be aligned to within 2mm. The entire guideway has been surveyed and a number of lateral steps greater than 2mm have been found. Again analysis has shown that the lateral restraint brackets are not sufficient to resist the design loadings.
- 4.10. The solution to these superstructure defects is to fix the guideway beams together in pairs so that the fixed ends are properly fixed and held in alignment both longitudinally and laterally, and to fix the bearings so that they cannot move out from under the beams. Capita have given further thought to how this might best be achieved taking into account the stiffness of the ladder beams. This will require each section of guideway to be lifted.
- 4.11. The foundation defect relates to a unilateral decision by Bam not to follow national guidance in dealing with clay susceptible to heave (expanding), when it is saturated and shrinking when moisture is reduced. Such clays are common in this area of the County and were identified in geotechnical investigations undertaken by the Council and provided to the tenderers.
- 4.12. On an annual basis the clay shrinks and swells seasonally, but over the longer term it is affected by tree roots removing moisture. The foundations should have been built sufficiently deep to minimise the risk of either of these occurring, but BAM unilaterally chose to reduce the depth.

- 4.13. The investigation proposed by BAM Nuttall primarily considered the superstructure defects but did include monthly levelling at a number of locations in the susceptible areas. The information produced from these surveys has not altered Capita's opinion regarding the problem or solution. This was anticipated when this survey was proposed and in consequence the Council declined to contribute to the funding.
- 4.14. Several of the investigations required the removal of the infill between the guideway beams. In doing so it was identified that a number of the beams had spalling of their underside at the ends. Spalling is where edges and corners of concrete break away, usually as a result of point loading being applied. An additional investigation was agreed to examine a sample of beam ends to establish how frequently this occurred and to measure the extent of the spalling. This established that some 13.5% of beam ends have significant or severe spalling that needs to be repaired to prevent corrosion of the concrete.
- 4.15. It is considered that this spalling is caused by localised pressure exerted by lateral restraint brackets applying a point contact load where they are not perfectly aligned against the concrete.
- 4.16. The levelling surveys have revealed that there are sudden short ramps or steps where the precast ladder beams interface with in-situ concrete slabs close to junctions and at the park and ride sites. These are outside the specified tolerances and are therefore a defect.

5. COSTS

- 5.1. The costs of rectifying the defects has been re-assessed by our independent valuation expert. As set out in the previous report rectification has been priced on two basis. Firstly on the basis of carrying out pro-active rectification to deal with the defects, and secondly on a reactive basis to deal with the defects as they occur.
- 5.2. The expert refers to the pro-active approach as Option 1. As all the superstructure and foundation defects require the guideway beams to be lifted the reactive approach has considered two further options: Option 2 to carry out all required remedial works including foundation works whenever it is necessary to deal with excessive movement of the guideway, and Option 3 to carry out only superstructure remedial works whenever it is necessary but to deal with foundation settlement by adding concrete blocks on an as required basis between the foundation and the bearing pads.
- 5.3. Option 1 requires a one-off short term expenditure while the cost of the reactive approach would be spread over the lifetime of the guideway and depend on the actual rate of failure as it is not possible to predict precisely the future rate of failure the reactive approach has also considered a low, medium and high intensity rate of repair.

5.4. The comparative costs are set out below.

Option	Estimated Cost
Option 1	£36,500,000
Option 2 – Low Intensity	£102,000,000
Option 2 – Medium Intensity	£128,000,000
Option 2 – High Intensity	£164,500,000
Option 3 - Low Intensity	£74,000,000
Option 3 – Medium Intensity	£91,000,000
Option 3 – High Intensity	£119,000,000

- 5.5. The costs of the reactive approach include an allowance for inflation over the remaining 35 year design life of the Busway.
- 5.6. As a result of the additional information and the additional defects identified by the investigations the costs of rectification have risen.
- 5.7. While there is considerable uncertainty around forecasting the rate at which defects will manifest themselves it can be seen that even on the most optimistic scenario the reactive approach is very much more expensive than the pro-active approach.
- 5.8. As before the cost assessment has been made on the basis of the Busway being closed one section at a time to allow bus services to be maintained with the minimum of disruption. The work will take around three years to complete. Evening or weekend working is not practical given the scale of the operation. Replacing the foundations will require at least the partial removal and hence closure of the adjacent maintenance track. It may be possible for the maintenance track to remain operational during superstructure works but this will depend on the detailed working methods adopted.
- 5.9. The cost assessments are considered sufficient for the purposes of considering the appropriate course of action at this time, but Officers propose to commission further work to develop more detailed proposals for the remedial work and the methodology for carrying it out.

6. LEGAL ADVICE & PROCESS

- 6.1. The legal advisers and the independent experts have reviewed the defects, including correspondence with BAM Nuttall, against the Contract requirements, and concur with the Project Manager that all of the defects are defects.
- 6.2. The Project Manager, the legal advisers and the independent experts have considered the results of the investigatory work and remain of that view. Indeed the evidence revealed from the investigations provides further support for that view.

- 6.3. As a result of the investigations a number of the defect notices already issued to BAM Nuttall have been revised and updated, and additional defect notices have been issued.
- 6.4. The contract states:
If the Contractor has not corrected a notified defect within its defect correction period, the Project Manager assesses the cost of having the defect corrected by other people and the Contractor pays this amount. (Clause 45.1 NEC 2nd Edition)
- 6.5. If, as expected, Bam Nuttall do not pay the amounts assessed by the Project Manager they will be in breach of contract and this would be the primary basis on which the Council would commence legal action.
- 6.6. The Council also has a second basis for claim against Bam Nuttall for breach of contract for failing to provide the works in accordance with the works information.

*The Contractor provides the works in accordance with the works information.
(Clause 20.1 NEC 2nd Edition)*

- 6.7. Under an action for breach of contract the Council is entitled to claim consequential losses, such as loss of access charges, in addition to defect correction costs, but a claim made on this basis would need to show that costs were reasonably incurred.
- 6.8. It should be noted that in addition to cost it is also appropriate to take into account other associated impacts such as the disruption to passengers and maintenance track users of ongoing reactive repairs, the risks to the Council, both that the forecasts might underestimate the volume of repairs and that the volume of repairs at any one time might be too great to effectively manage, and the ongoing management and monitoring of the busway for defects.
- 6.9. As set out above it is not reasonably possible to precisely quantify the likelihood of these outcomes occurring, the expert advice has assessed a material risk that a significant number of the potential problems will emerge over the life time of the Guideway. The Council is required to consider and weigh in the balance a range of matters including the following:-
- i) the potential future risks of faults emerging over the lifetime of the guideway.
 - ii) the impacts upon the Busway users and to the Council and indirectly to Council tax payers.
 - iii) the relative costs of the options for rectifying the defects.

7. MEETINGS WITH BAM

- 7.1. The investigations arose following an approach from BAM involving a senior Bam representative and a senior representative of their designers, neither of whom have had any previous involvement in the project.
- 7.2. The BAM representative's original proposal included a programme that concluded with 'Agree Recommended Technical Resolution'. While there has been extensive engagement with the BAM representatives in the undertaking

of the investigations, discussions following the investigations have been limited to agreeing the factual results. There has been no discussion of the reasons for the results or of potential solutions, and at no time have BAM accepted liability for any defects nor have they identified who would be responsible for implementing any technical resolution that was identified.

- 7.3. It should be noted that any contractual obligation on the Council to allow Bam Nuttall to investigate or fix the defects has long since expired; Bam have been fully aware since the settlement that the Council is taking advice on legal action regarding the defects.
- 7.4. If Committee decide to reconfirm the instruction to officers to commence legal action the process will be governed by the pre-action protocol, which encourages the parties to seek ways to settle their differences. This could well include further discussions between experts as to the causes of the defects for example. The Executive Director also meet regularly with a senior director of BAM Nuttall.
- 7.5. None of the above is considered to be a reason to delay or defer a decision on taking further legal action. Should a proposal be put forward by or on behalf of BAM Nuttall to the County Council then the decision can be revisited based on the substance of that or any other proposal.

8. COSTS OF LEGAL ACTIONS

- 8.1. The Council has set aside from liquidated damages deducted from BAM Nuttall a fund that has been used to date to fund the work on the Busway defects. £2.2m remains in this reserve.
- 8.2. It is hoped that a settlement will be reached by negotiation or mediation, which could be on a cost inclusive basis, but this cannot be guaranteed.
- 8.3. Since October 2013 £3.07m has been spent on professional fees in regard to advice on the Busway defects and £192,000 on the Council's share of the investigations. It is estimated that the cost of pursuing legal action should the matter proceed all the way to court a further £5.7m could be spent.
- 8.4. The costs to date and any future costs incurred will form part of the claim against BAM Nuttall and the Council would seek to recover as much of these costs as possible, but typically, with the usual uncertainties in litigation, only 50% to 60% of costs are recovered.
- 8.5. The estimated costs of legal action exceed the amount currently held in the earmarked reserve and therefore further resources will need to be made available should the Council wish to pursue legal action against BAM. As the timing of this action is not known, at this point it is suggested that should the Council incur any costs within the financial year ending 31st March 2018 that these will be funded from within the General Reserve. During the autumn of next year greater clarity will be available on both the timing and incidence of any potential costs and therefore provision will be made within the Business Plan for 2018/19 at that point should this be necessary.

9. SUMMARY

- 9.1. The total cost of rectifying the Busway defects is estimated as at least £36.5m.
- 9.2. Counsel and the independent technical experts agree that the defects are defects under the Contract.
- 9.3. The Project Manager and the independent technical experts agree that the defects should be corrected given the costs, risks, uncertainties and ongoing disruption of a partially or wholly reactive approach.
- 9.4. Counsel has advised that in his view BAM are in breach of contract in respect of both the defect provisions and their general responsibility to provide the works. Counsel's detailed advice on the conduct of legal action and the potential outcomes is contained in confidential appendix C.
- 9.5. Counsel's advice is that if the Council opts to take legal action then the first step is to resolve to rectify the defects.
- 9.6. Officers' advice is that the risks to the Busway and the potential costs to the Council of adopting a reactive approach to the defects is unacceptable and that the defects need to be rectified. Officers also consider that, based on experience to date, it will be necessary to commence legal action to secure a satisfactory settlement from BAM.
- 9.7. Litigation is never risk free, and while the facts of the case support the Council's position, the case involves some complexity, particularly around the issue of what is a reasonable course of action. In coming to a decision members will need to balance the risks of litigation against the potential future repair costs of the Busway.

10. ALIGNMENT WITH CORPORATE PRIORITIES

Developing the local economy for the benefit of all

- 10.1. The report identifies the costs and risks in respect of the defects to the guided busway. The Busway is an important piece of transport infrastructure supporting the growth of housing and jobs. Ensuring its ongoing availability is therefore important.

Helping people live healthy and independent lives

- 10.2. The Busway is used to access employment, education and recreation. Ensuring its ongoing availability is therefore important.

Supporting and protecting vulnerable people

- 10.3. The Busway is used to access employment, education and recreation by people who are unable to drive or cycle, or do not have access to a car. Ensuring its ongoing availability is therefore important for these groups.

11. SIGNIFICANT IMPLICATIONS

Resource Implications

- 11.1. There are significant resource implications. These are detailed in the report and attached appendices.

Statutory, Risk and Legal Implications

- 11.2. There are significant risk and legal implications. These are detailed in the report and attached appendices.

Equality and Diversity Implications

- 11.3. The Busway is used to access employment, education and recreation by people who are unable to drive or cycle, or do not have access to a car. Ensuring its ongoing availability is therefore important for a wide range of people.

Engagement and Consultation Implications

- 11.4. Undertaking remedial works will require a programme of engagement and communication to advise and inform people regarding disruption to bus journeys and closures of the maintenance track. This would not be possible with an ad-hoc reactive approach.

Localism and Local Member Involvement

- 11.5. Undertaking remedial works will require a programme of engagement and communication to advise and inform local members regarding disruption to bus journeys and closures of the maintenance track. This would not be possible with an ad-hoc reactive approach

Public Health Implications

- 11.6. The Busway provides significant public health benefits to both bus passengers and for cyclists and walkers. Undertaking a planned programme of remedial works will be less disruptive and will ensure the longer term availability of both the Busway and maintenance track. An ad-hoc reactive approach is likely in the longer term to have a greater impact in discouraging healthy travel options.

Implications	Officer Clearance
Have the resource implications been cleared by Finance?	Yes Name of Financial Officer: Sarah Heywood
Has the impact on Statutory, Legal and Risk implications been cleared by LGSS Law?	Yes Name of Legal Officer: Quentin Baker
Are there any Equality and Diversity implications?	Yes Name of Officer: Tamar Oviatt-Ham
Have any engagement and communication implications been cleared by Communications?	Yes Name of Officer: Mark Miller
Are there any Localism and Local Member involvement issues?	Yes Name of Officer: Paul Tadd
Have any Public Health implications been cleared by Public Health	Yes Name of Officer: Iain Green

Source Documents	Location
Agenda and Minutes, Cabinet 1/3/2005, 7/2/06, 13/6/06, 11/7/06, 16/10/07, 16/12/08, 29/9/09, 16/3/10, 27/4/10, 25/5/10, 15/6/10, 5/7/10, 7/9/10, 28/9/10, 26/10/10, 16/11/10, 14/12/10, 25/1/11, 22/2/11, 15/3/11, 5/4/11, 15/6/11, 5/7/11, 17/9/12, 28/5/13, 18/6/13, 2 4/7/13, 9/8/13, 15/4/14	Shire Hall Room 322