Silver Jubilee Bridge Complex - Major Maintenance Scheme

Full Business Case
Strategic Case - Section 2
October 2015

Halton Borough Council
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Halton Borough Council
## Issue and revision record

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<tr>
<th>Revision</th>
<th>Date</th>
<th>Originator</th>
<th>Checker</th>
<th>Approver</th>
<th>Description</th>
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<tr>
<td>A</td>
<td>08/10/2015</td>
<td>W Edwards / N Searle</td>
<td>F Johnston</td>
<td>R Langley</td>
<td>FBC First Draft</td>
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<tr>
<td>B</td>
<td>16/10/2015</td>
<td>W Edwards / N Searle</td>
<td>F Johnston</td>
<td>R Langley</td>
<td>FBC First Issue</td>
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2 The Strategic Case

2.1 The Proposed Scheme - Background

Halton Borough Council (the Council) has been responsible for the Silver Jubilee Bridge Complex (SJBC) since becoming a Unitary Authority in 1998. The Council inherited the assets in a condition with a significant degree of maintenance deficit and has been working hard since to rectify this position. During the period 2009 to 2014 the Department for Transport (DfT) funded a major scheme to remove a significant amount of the backlog of maintenance that had built up over the years prior to Halton taking responsibility as a Unitary Authority. This programme of works over 5yrs between 2009 and 2014 also addressed an additional maintenance deficit built up under Halton’s responsibility due to a significant mismatch between the cost of maintaining the structures in the SJBC and the available highway maintenance funding. While the DfT funded the removal of the maintenance deficit, it was always apparent from the appraisal of the previous major maintenance scheme that the issue of insufficient funding would continue, once the backlog had been removed. The result is that the works necessary to maintain the SJBC structures in a steady state condition and safe-guard the capital investment in removing the backlog, will always remain beyond the reach of Halton’s available revenue funding. The result is a funding gap that needs to be addressed in order to ensure that a further backlog of maintenance does not accumulate and the previous capital investment provided by DfT between 2009 and 2014 is not reduced in value as a consequence.

In the period 2009 to 2014, the DfT provided £18.9 Million capital to remove the maintenance deficit as the previous major maintenance scheme. Of this funding approximately £14 Million was delivered during the period, with agreement being reached with the DfT that £4.9 Million be deferred until financial year 2017/2018. This has been agreed to allow the painting of the high arch of the Silver Jubilee Bridge (SJB) structure during the closure of the bridge for the reconfiguration works, resulting from the Mersey Gateway project. It was identified that this approach would save both time and cost by undertaking the works during complete closure to traffic enhancing safety for both workers and users. The high arch painting works are shown in this scheme’s programme for co-ordination purposes only and do not form part of the current Major Maintenance Scheme bid.

This Silver Jubilee Bridge Complex (SJBC), Major Maintenance scheme (preferred scheme) has been developed to address the identified lack of funding in the Silver Jubilee Bridge Complex and to

Problem identified:
..funding gap that needs to be addressed in order to ensure that a further backlog of maintenance does not accumulate and the previous capital investment.....is not reduced in value......
maintain a steady state condition of the assets. Halton Borough Council has previously investigated the amount of capital required annually to maintain the Complex in a steady state condition, i.e. interventions undertaken at an appropriate time to prevent the deterioration of assets to a point where they would then require major additional capital funding to return them to a safe operational condition. The work undertaken by the Council has determined that the required funding varies between £1.6M and £2.2m annually, for steady state maintenance of the SJBC.

This document will detail the intervention works that will be required on the SJBC over the five year period from April 2016 to March 2021. However, this Major Maintenance Scheme bid is primarily for 3 years of funding from April 2016 to March 2019. The additional 2 years from April 2019 to March 2021 are included in case the Liverpool City Region is able to commit to the additional funding in line with the Council’s five year maintenance strategy. The Council has already established the activities that will be undertaken during this scheme (3 years) in the Options Appraisal Report that has been previously submitted to the Liverpool City Region (LCR), Local Transport Body (LTB).

The work that The Council has completed as part of the Options Appraisal Report also assessed alternative options to this scheme and demonstrates the reasoned justification for this scheme as the preferred option. The Council believes, therefore, that the financial support requested by this submission of £3.5 Million over 3 years is justified and affordable given the importance of the SJBC in supporting the Mersey Gateway project and realising the benefits of that scheme, and the vital role the Complex plays in supporting the connectivity of the Borough’s communities.

The Do-Nothing scheme option considered by Halton uses the funding available to the Council via normal funding streams, primarily the Formula Funding relating to SJBC. The Do Nothing scheme then looks at the maintenance that could be achieved with this relatively low level of finance. For context, the current level of bridge maintenance funding that Halton may receive on average in the period 2016/2017 to 2018/2019 is calculated (estimated) at approximately £100,000 per annum. Because of this low level of available funding only rudimentary maintenance works such as small painting and some inspection works can be undertaken. The scale of funding is such that it is not possible to even maintain a proper understanding of asset condition as inspections alone cost more than available revenue funding, in part due to the cost of access arrangements. Similarly, the cost of access to difficult to
reach areas would be precluded as would any structural repair works, simply on the basis of cost.

With this scenario in mind, the inevitable structural demise of the Complex would ultimately result in either load (weight) restrictions being put in place and or lane closures in the short to medium term followed by total closure to motorised vehicles in the longer term. The determining factor for these scenarios would be on the grounds of safety, either due to the actual condition of the structure (i.e. structural capacity / deterioration) or due to lack of knowledge of areas of the structure known to be prone to deterioration.

Because the structure has very little redundant capacity, the Do Nothing scenario is seen to be likely to require a lane closure sometime in the period from 2018 to 2025 resulting in one bi-directional lane for traffic operating under traffic control over the SJB. In time, it is likely that further deck failures would lead to a total closure (to vehicular traffic) in approximately 2030. These scenarios can only be estimates in terms of the timing of events but are based on the current engineering knowledge of the structures and their condition, using engineering judgement. There are a number of areas where relatively minor defects would cause significant concern about the safety of the structure, for example, a localised deck failure or deterioration in the condition of the hangers supporting the suspended span.

The reduction in capacity of SJB to a single lane will result in traffic queues on both sides of the bridge during the inter-green period and will increase the harmful emissions from vehicle exhausts contaminating air quality within Halton. Once the Bridge is closed entirely, whilst the impact of queueing traffic may be removed, the overall volume of vehicle emissions is likely to increase as traffic will have to travel further, using the Mersey Gateway, to complete the equivalent end to end journey.

2.1.1 Existing Environmental Issues

The maintenance of the SJBC and particularly the bridge are crucial to being able to deliver the overall Mersey Gateway (MG) strategy which includes providing enhanced public and non-motorised travel facilities. While it is inevitable that building the new MG crossing is likely to encourage some growth in motorised vehicle journeys, the overall MG strategy sets out to balance this with improved provision for buses, cyclists and pedestrians via the Silver Jubilee Bridge Complex. In this
way, the SJBC and its maintenance in a good condition are critical to realisation of environmental and health benefits of alternative non-motorised modes of travel.

The existing SJBC does not provide high quality pedestrian or cycle facilities and no doubt contributes to dissuading more environmentally positive modes of travel. Through the MG strategy, the facilities for all forms of environmentally positive transport i.e. pedestrians, cyclists and bus travel will be enhanced. This can only be achieved if the SJBC is maintained in an appropriate condition. It is also a fact that pedestrians and cyclists require a high level of surface maintenance to prevent accidents than is the case for vehicular traffic, arguably leading to more onerous maintenance requirements.

The SJB still has some of the original lead based paint applied to some of the main elements of the bridge. Removal of the remainder of this environmental risk from the bridge will be beneficial for the long-term maintenance work on the structure including reducing health and environmental risks while also substantially reducing the costs of future maintenance painting.

2.2 Scheme Fit to The Council’s Objectives

Halton Borough Council (The Council) has prepared its Local Transport Plan 3 which sets out The Council’s strategy for the transport network within The Council’s administrative boundaries from 2011 to 2026.

However, on the 1st April 2014, Halton became part of the Liverpool City Region (LCR) Combined Authority. In doing so, there was a requirement that both Merseyside and Halton LTPs be review and brought up to date, reflecting changes in governance and in both national and local policy (including devolution and the need to rebalance the economy). This has resulted in the production of the Transport Plan for Growth which sets out a Joint Strategic Framework for Transport for the LCR and a combined Investment and Delivery Programme over the next 6 year period. This plan was approved by the LCR Combined Authority on 1st April 2015. The two LTPs however, will continue to set the policy direction.

The Council recognises that a strong transport network can attract investment, new businesses and jobs to Halton, and can contribute to a healthier, stronger and more socially mobile Borough by providing transport links not only for the residents of Halton and for an increased
number of visitors to the area but, for the Liverpool City Region as a whole.

The economic circumstances in which the Council now finds itself operating in are very different from those of a few years ago. There is significantly less public funding available, but the Council must ensure that its objectives of regeneration and growth to fulfil the aspirations of the local population are supported by a safe, low carbon, and efficient transport network. The Council has a good recent track record in providing urban regeneration after years of economic decline and the loss of employment in traditional industries. Project successes include:

- The Widnes Waterfront Development
- The 3MG Site

These successful regeneration projects have been directly supported through their location close to the Silver Jubilee Bridge crossing. Previous investment by DfT to remove the maintenance deficit associated with the SJBC has ensured the continued safe operation and availability of the crossing. In order to realise the benefits of this initial investment by the DfT, it is important that the complex is not left to fall into disrepair. Measured investment should be sustained to ensure that timely intervention works are undertaken to uphold a steady state maintenance condition of the Complex, thereby safeguarding the much needed regeneration and ensuring lower whole-of-life cost.

The road network and infrastructure comprising the Silver Jubilee Bridge Complex is a significant part of the Borough’s primary road network. The Silver Jubilee Bridge crossing of the River Mersey and Manchester Ship Canal will soon no-longer be the only crossing of these waterways within the Borough once the Mersey Gateway crossing has opened. The Silver Jubilee Bridge crossing is however, of fundamental importance to the local towns of Runcorn and Widnes; ensuring the ongoing accessibility and connectivity of the two communities for both residents and businesses. The Mersey Gateway crossing is not a replacement for the localised connection of the Runcorn and Widnes communities.

The Council recognises the need for active management and effective maintenance of the SJBC and the numerous structures that make up the crossing to ensure maximum availability of the crossing to users at all times. The ongoing operability of the SJBC is not an end in itself; its purpose is to serve the needs of wider society. The SJBC crossing provides a vital service to local populations and businesses;
the loss in functionality of the crossing would have negative consequences on the local economy and the isolation of the borough’s communities.

The Council faces socio-economic issues that it must also address, these include:

- Lower than average levels of educational attainment and skills
- Higher than average levels of unemployment
- A high level of dependency on state benefits
- High levels of social deprivation
- Below average health levels compared with the rest of England.

For these reasons, it is of vital importance to the ongoing economic prosperity of Halton that the crossing continues to offer an attractive connection for the communities of Widnes and Runcorn, including after the Mersey Gateway crossing is operational. As part of the implementation of the Mersey Gateway crossing project, the SJB will be reconfigured from the current narrow 4 lane carriageway to a 2 lane carriageway for local traffic and buses with enhanced pedestrian and cycle facilities, making a more balanced use of the road space for low-carbon transport modes. Once the reconfiguration works have been completed as part of the Mersey Gateway project, SJB will provide a walkway, cycleway and bus way crossing of the River Mersey and this forms a fundamental part of the Mersey Gateway Sustainable Transport Strategy. This crossing will give local residents a free means of moving between Widnes and Runcorn, increasing population mobility for work, ensuring efficient access to local education and health care which will assist the Council in alleviating some of the socio-economic issues outlined previously.

It is essential that the SJBC is maintained to ensure maximum safe availability in order for the Mersey Gateway Transport Strategy to deliver on its promises, specifically Improvement Themes 1 and 2 which set out the implementation, development and enhancement of a refreshed and re-branded Halton Rapid Transit Network bus service. The regeneration of the town centres of Widnes and Runcorn will be driven by the improved connectivity via low carbon and public transport modes, central to which is the cross Mersey link that SJB provides.

The Council has identified that the SJB Complex has a direct impact upon the 4 main priorities set out in the LTP3 as follows:

- Jobs – To transform the City Region’s prospects by increasing the scale of economic activity by raising and growing business
levels and securing jobs. Maintaining the SJB crossing will ensure that local businesses remain connected, commercially viable and competitive while providing local residents with an affordable, reliable and safe commute to work.

- Worklessness and Skills – To radically redraw the deprivation map in the City Region, halving the number of LCR wards ranked in the UK’s most deprived 10% of wards. The Mersey crossing that SJB can offer to local residents will improve the accessibility to health care and promote healthy lifestyle choices through better pedestrian and cycleway connectivity helping to reduce or prevent further increase in health conditions preventing the ability to work. The enhanced free and sustainable means of crossing the river will enable local residents to attend education and training establishments which will raise the local workforce skill levels and increase their employment prospects. But, it's not just about increasing prospects but delivering on improving the environmental sustainability of the borough by offering low or zero carbon alternative transport modes to those opportunities.

- Health – To develop collaboration to reduce health inequalities and address the challenges these present across the City Region. As already noted previously; it is very clear the additional health benefits that maintaining the SJB crossing can bring to Halton communities, both in regard to lifestyle choices and access to health services. It should also be noted that the new Mersey Gateway crossing will not provide facilities for non-motorised users (pedestrians or cyclists).

- Efficiency – To develop a sustainable structure of collaboration and shared services across the City Region. The improved Halton Rapid Transit Network will allow the efficient transit from one side of the river to the other via the SJBC. The Bus services can capitalise on a greatly improved consistency in journey time and overall reduction in crossing time due to the reduced traffic flow that SJB will experience as 80% of traffic is forecast to switch to the Mersey Gateway once operational. This will help to grow the bus network across the region, enhance its commercial viability, reliability and thus open up access to facilities within Halton borough.

While the focus above has been on the transport benefits of the SJBC it's important to mention that the SJBC is much more than just a transport link between Runcorn and Widnes. Unlike the new Mersey Gateway crossing, the SJB carries critical utility infrastructure including...
principal gas and communication infrastructure, which is vital to the Region and to businesses on both sides of the river.

Proper and safe maintenance of the structures has to take into account not just the transport functions of the SJBC but also its fundamental role in the provision of utility services. Without these, substantial parts of the local business economy would be unlikely to function in a commercially sustainable manner. The SJBC offers one of the few strategic crossing points for utility companies to create a robust resilient services infrastructure for the Region.

2.3 **Scheme Fit to Regional Government Objectives**

The Council recognises that this scheme compliments the 6 core goals of the Merseyside Local Transport Plan, which are consistent with and add to the transport objectives of the Government. It should be noted that all goals are held with equal status by the Council;

1. Ensure the transport system supports the priorities of the Local Strategic Partnership, the Local Enterprise Partnership and the Liverpool City Region.
2. Provide and promote a clean and low carbon transport system
3. Ensure the transport system promotes and enables improved health and wellbeing.
4. Ensure the transport system allows people to connect easily with employment, services and social activities.
5. Ensure the transport network supports the economic success of the City Region by the efficient movement of goods.
6. Maintain our transport and highway assets to a high standard

This scheme will enable the objectives of the Mersey Gateway Sustainable Transport Strategy to be realised through the ongoing availability of the SJB Complex. Once the reconfiguration works of the SJB deck have been completed, SJB will offer new and safer means for pedestrians and cyclists to cross the Mersey. The reduced traffic volume over SJB, once the Mersey Gateway has opened, means that bus services will offer faster journey times and improved reliability, helping to bring the communities of Widnes and Runcorn closer together. This will open up access to healthcare and education and create opportunities for work. There is evidently a very clear correlation between this scheme and goals 2,3,4,5 and 6 of the Merseyside LTP. The recently approved local Transport Plan for Growth amalgamates
the visions of the two LTPs and sets out a framework for delivery the transport objectives for the LCR.

2.4 Scheme Fit to National Government Objectives

This scheme is directly aligned with DfT ‘Improving local transport’ policy, and specifically the priorities of the Department:

- Encouraging sustainable local travel.
- Promoting lower carbon transport, such as walking and cycling as well as introducing more environmentally-friendly buses and trains.

The Council believes it is essential that the Silver Jubilee Complex is maintained following a steady state condition strategy to ensure its ongoing maximum availability to users and to reduce the whole-of-life cost. The reduction in whole-of-life cost is seen as an essential objective both in helping the Council manage its finances effectively and in helping meet the Government’s on-going deficit reduction strategy. In line with the Government’s determination to maintain its capital assets in a proper structured manner to reduce the incidence of unplanned major expense, steady state maintenance of SJBC is essential. However, the Council is not just seeking to continue to maintain SJBC at a steady state condition but is actively seeking to reduce the cost while maintaining the condition of the Complex. To this end, and as part of this major maintenance scheme, the Council has developed an Innovation Strategy looking specifically at opportunities to use modern innovations, technology and skills to reduce the costs of maintaining the SJBC in the widest sense. This strategy is set out in Section 8 of this major scheme business case.

The strategic crossing of the River Mersey for regional and national traffic will be the Mersey Gateway once the new crossing, currently under construction, becomes operational in 2017. The SJBC, however, has a pivotal role in the realisation of the benefits, in particular the Sustainable Transport Strategy, of the Mersey Gateway scheme. The SJBC will continue to be a vital crossing for residents of Halton Borough to keep communities connected and promote healthier, sustainable transport options and lifestyle choices.

The Council has recently completed a programme of works, funded by the DfT, to remove a backlog of maintenance on the SJBC and return it to a better state of repair. A fundamental objective of that programme...
was to return the Complex to a condition where a consistent and proportionate level of annual investment would enable the SJBC to be maintained in a steady state condition; components of the complex could be maintained to an appropriate condition to ensure the ongoing availability to users of the SJBC, without requiring substantial additional capital funding. As previously identified in the business case in 2009 the funding required for a steady state of maintenance on the SJBC was always likely to be greater than the funds available to the Council via normal annual maintenance funding streams. The Council has therefore taken all reasonable measures to identify possible funding to assist with meeting the costs of a steady state maintenance regime in order to protect the previous investment made by the Department for Transport in removing the previous backlog of maintenance.

The Council therefore believes it is prudent, that investment is made in this funding programme to enable the DfT to realise true value for money from its previous investment. Failure to achieve this will simply result in the build-up of a further maintenance deficit with substantial and disproportionate costs, out of step with the policy of deficit reduction and prudent control of spending.

There are two further Government objectives that the preferred scheme (Do Something) sets out to address:

- Obsolete Technology
- BIM by 2016

The current structural analysis model for the Silver Jubilee Bridge is based on the LEAP5 software which is no longer supported by the software vendor. In addition, the software only operates on the Microsoft Windows XP ® computer operating system platform. Essentially, both the analysis software and operating system are obsolete and no longer maintained resulting in a risk for Halton in the ongoing analysis of the structure.

The analysis model is fundamental to making on-going pragmatic judgements on actions concerning safety of the structure. This is particularly true when undertaking maintenance works as the temporary works (e.g. scaffolding and protective sheeting for painting) can have fundamental impacts on the safety of the structure. To ensure the structure is always well within its capacity, the analysis model is used to assess the proposed temporary works. Without confidence in the analysis model, it is inevitable that the engineers responsible for the safety of the structures will make ever more conservative judgement
decisions when assessing proposals, and this is particularly true of the Do-Nothing scenario. As the maintenance spend remains constrained, the condition of the structure will become more unknown and will deteriorate. The judgements required of the engineers will be wholly dependent on the analysis model and the lack of confidence in the current model could bring the closure date in the Do Nothing scenario forward.

The current model developed and validated in 1998 does not include condition assessment information by default and there is no direct link between the inspection information and the analysis model.

As the structural analysis model is a fundamental part of determining the extent of structural interventions and general safety risk management, the replacement of this is included as part of this scheme. The scope of this work will go beyond the simple migration of the existing structural analysis model to a new software platform. The intention is to take the opportunity to migrate to a BIM based solution starting with the construction of a model suitable for structural analysis. The work involved in this is quite significant given the number of structural members, complexity of connections and scale of structure involved.

However, the investment required to achieve this is believed to offer significant potential for future savings on maintenance works, procurement and certainty of works delivery.

Of particular importance is the intention that the BIM model will be used to track long-term maintenance including integration with the asset management system to record works undertaken, inspection and condition information. This will also form the base for the proposals set out in the innovation strategy.

Having an up-to-date BIM model of the SJB and approach viaducts will allow information gathered using forthcoming technology to be fed into the BIM model regularly, informing directly on condition and alerting Halton’s engineers to any areas needing attention before they become critical. With the ability to be able to collect condition information more frequently while still saving on cost, there will also be the opportunity to understand condition trends too. This will enhance the ability to forward plan maintenance and to only intervene when necessary based on a much more comprehensive understanding of deterioration and structural performance.
As a result, and in line with the Governments’ objectives as set out in the Highways Maintenance Efficiency Programme, the Council intends to bring both inspection and structural assessment regimes for the SJB up to current technology standards with a view to improving value for money across maintenance activities on the SJBC.

2.5 Scheme Objectives

The scheme objectives are relatively straightforward with the fundamental aims of supporting the economy and prosperity of Halton Borough and the LCR both now and in the future in a sustainable manner. The objectives have been arrived at by review of the Council’s Local Transport Plan (LTP3 – Section 6 The challenges and opportunities) and Infrastructure Maintenance Plan 2014. The nature of the scheme (or programme of works) is such that it is effectively routine capital maintenance. It is therefore essential that the scheme delivers in line with local, regional and national policies on highway infrastructure maintenance. Breaking this down into specific objectives, these include;

1. Maintain the structures within the SJBC such that their condition remains steady state i.e. does not fundamentally deteriorate from year to year creating a backlog of work for the future. This will be a long term measure of success; the Council will have been successful in meeting this objective if future applications for capital maintenance funding remain within the £1.6M to £2.2M bracket as identified previously by the Council to maintain a steady state condition of the SJB and approach structures, capital renewals excepted.

2. Maintain the structures within the SJBC such that they are in a safe condition, while maximising the availability to users; i.e. achieve steady state maintenance with minimal disruption to users. The Council shall measure this objective by annually monitoring the daily availability of the crossing and comparing this against the availability currently achieved. The Crossing availability data shall be published in our annual reports.

3. Minimise the whole life-cycle cost of maintaining the SJBC structures by ensuring timely intervention, thus resulting in regular (annual) intervention to maintain the condition rather than undertaking major capital works to replace parts of the assets. The measure of success for this objective will be the same as for Objective 1, above. The Council will have achieved minimal whole life cost of maintaining SJB if future applications for maintenance works remain within the £1.6M to £2.2M funding bracket. This will
be subject to individual structures within the SJBC reaching life expiry as determined through structural inspection, scale of repair and replacement being required in line with normal life expectancy.

4. Deliver the required availability of the SJBC in line with the contractual commitments made with regard to the Mersey Gateway project. The Council shall handover the SJBC crossing to the Mersey Gateway project in line with the dates set out in the Scheme Programme included in Section 7 of this Business Case, such that no programme delays are incurred to the Mersey Gateway project or this maintenance scheme, that are a direct result of the Councils actions or inaction.

With the exception of Objective 4, Halton consider the time boundaries for meeting the above objectives on-going indefinitely or until the individual structures within the SJBC become life expired as determined through structural inspection, scale of repair and replacement required. The time boundary for this particular business case is for 3 years of additional funding in line with central government funding cycles.

The above points describe the objectives of Halton Borough Council and the LCR with regard to the on-going availability, safety and affordability of the SJBC. It is necessary to note, that development of the Mersey Gateway scheme is complimentary to the SJBC and not a replacement. In particular, the SJB continues to provide the primary pedestrian, cyclist and bus facilities for crossing the Mersey and Manchester Ship Canal. This position has previously been accepted by the Department for Transport as part of the business case for the Mersey Gateway scheme.

2.5.1 Future Problems

In the event that the scheme does not go ahead, long term, the result would be a loss of functionality of the SJBC, resulting in wide reaching impacts on transport and non-transport benefits to the local communities of Runcorn and Widnes.

Importantly, the populations of Runcorn and Widnes would ultimately be severed by the loss of the SJB crossing, whether this is for particular modes (e.g. HGV traffic initially) potentially removing public transport bus facilities, or for all modes. In the worst case whereby the bridge is closed entirely on safety grounds, there would be a direct loss of pedestrian and cyclist crossing facilities of the river, these not being provided by the MG. The loss of the SJB crossing could also increase
Car dependency as residents will be forced to drive to another crossing point, most likely the Mersey Gateway, in order to cross the river for social or commercial purposes. The loss of SJB could also have severe social impacts as it is likely that due to the increase in time, cost and effort in crossing the river, some trips may no longer be made which could result in a breakdown of boroughs’ sense of community and cross-river interaction.

The long term impacts on the population will be loss of public amenities many of which are shared across the river, alongside loss of employment opportunities and business development opportunities. The loss in employment opportunities is a threat to the local population demographic; the working population, which includes young families, may be forced to relocate out of the Halton area in order to find employment. This will have a negative impact on the social fabric of the borough as dependants, young professionals and young families leaving behind an increasingly ageing population. This could affect the Halton’s economic sustainability as the population ages, resulting in a reduction in the number of residents with disposable income that is normally spent in local shops and businesses and is so vital to the local economy.

In the case of lost employment opportunities, this would have negative impacts on the local economy of Runcorn and Widnes with a wide range of job losses expected including from local public transport operators and businesses that are dependent either on resource or sales opportunities from the other side of the river. While in some cases use of the MG as an alternative route may be practical, the increased costs may make some marginal businesses uneconomic. Importantly, loss of direct and ready connectivity between the two local communities is likely to make it more difficult to attract the inward investment that has been critical to the recent economic improvements. This may also have a direct impact on the Council’s Infrastructure Plan including the objective to provide a net increase of 9,930 dwellings and 313 hectares of employment land over the period up to 2028. SJBC alongside MG are seen as key to this level of sustainable economic development.

Future environmental impacts are likely to be limited to the loss of opportunity with regard to increased pedestrian, cycle and public transport trips if the scheme were not to go ahead and the availability of the SJB were to be lost. i.e. the increase in non-motorised trips anticipated by the MG strategy may be lost if the SJBC is not maintained in a safe and suitable condition. However, as noted above, the potential loss of the SJB crossing in its entirety is likely to increase
car dependency in the local area as trips over the SJB that could have been made by foot or cycle will have to be made by car. This will increase the total number of vehicle trips made within the borough and hence increase the negative environmental impacts associated with vehicle usage.

Similarly, without the scheme, opportunities to remove the existing lead based protection coatings will be lost, further increasing costs of maintenance in the future. Similarly, there is potential for local environmental contamination as the lead based coatings degenerate and peel from the structure without adequate maintenance, albeit in relatively small quantities.

### 2.6 Measurement of Success

The measurement of the scheme success will largely be indirect, for example, by reviewing the state of the local Halton Borough economy, subject to other relevant influencing factors. However, there are a few areas where direct measurement of success for the scheme in achieving the objectives can be measured. These include;

5. On-going costs of maintaining a safe SJBC
6. Improved knowledge of structural condition allowing improved maintenance interventions and planning going forward beyond this programme period.
7. Delivery of the defined programme of works within the funding period.

In the case of measure 3 above, this will be reviewed annually throughout the delivery of the programme to ensure that planning and delivery are in line with the scheme proposals and to ensure that any issues arising during the scheme delivery are addressed. This will include review of the work Tasks completed during the period and their out-turn cost against planned costs as set out in Appendix A of the Financial Case. This review will also include assessment of the risk management plan as set out in Section 7.10 of the Management Case.

The first two measures above are related, in that, improved knowledge of the structural condition and modelling of the structure should allow the identification of more efficient maintenance strategies going forward. This will also be consistent with the Mersey Gateway crossing becoming available also adding to the efficiency in working practices in
the future and works planning. Both of these aspects will contribute to ensuring the cost of maintaining the SJBC beyond this proposed programme of works will be lower in relative terms. Similarly, detailed and thorough inspection, using innovative technology where possible in line with the Innovation Strategy, will assist in developing enhanced knowledge of asset condition, behaviour and hence planning of timely intervention, minimising on-going maintenance costs and ensuring current spending is as effective as practical.

In addition to the above, the Council intends to undertake Standard Monitoring throughout the programme including the following parameters;

1. Scheme build (works completed in line with the programme of works set out in Appendix L of the Management Case)
2. Delivered scheme (works compared to original programme)
3. Costs (compared against Appendix A of the Financial Case)
4. Scheme objectives (are these met)
5. Travel Demand – not applicable and will not be measured
6. Travel Times and Reliability (assessment of impact of maintenance works)
7. Impact on the economy (indirect as a measure)
8. Carbon (impact of works assessed as part of construction)

2.6.1 Outputs and Outcomes

The success of the scheme will be measured by delivery of the programmed works over the period of the scheme within budget and with minimal draw-down of risk allowances. If the scheme results in enhanced information from inspections, incorporated in a BIM based asset management model, allowing better future prioritisation of works, identification of timely interventions and minimisation of whole life cost, the scheme will have been a success.

Similarly, ensuring the on-going safety of the structures within the SJBC while minimising the impact on users throughout the scheme duration is a key outcome. Ensuring on-going availability to users alongside the enhancements to be delivered by the MG scheme for pedestrians, cyclists and bus services, if also a key outcome; this will require close co-ordination of scheme works with Mersey Gateway reconfiguration works.
**2.7 Scheme Constraints**

There are a number of potential constraints on maintenance works undertaken across the SJBC. However, none of these are new to the experienced Halton Bridges team. The key constraints (as opposed to inter-dependencies discussed later) are the following:

- **Weather** – much of the maintenance works are weather dependent either because of rain (e.g. painting) or wind (protection sheeting and general safety).
- **In-house staff resource** to produce contract, design and specification documentations
- **Safety** in general and in particular safe working over live carriageways
- **Removal of original lead based paint**

These represent the main constraints to the scheme. However, Halton is experienced in managing the effective maintenance of the SJBC structures and has processes in place to manage these constraints to the best level practical. For example, while weather can clearly be a constraint, whether it’s heavy rain or strong winds, the former can be overcome with the use of sheeting to protect the works. Wind is a little more problematic and does constrain how much sheeting can be applied to various parts of the SJB at any one time so as not to overload the structure. However, Halton have proven solutions in place to address these risks using the existing structural analysis model to ensure loads are within the structures capacity and breaking down the works into small enough areas to manage the overload risk.

For the in-house staff constraint, Halton already has a framework contract in place jointly with Warrington Borough Council to permit the appointment of consultants to assist with documentation, procurement, design and specification, as appropriate.

The removal of the original lead based paint is again work that Halton has been undertaking progressively for a number of years and methods, agreed with the Environment Agency have already been developed, tried and tested to contain the material during removal.

While the weather clearly isn’t a risk that can be directly managed, it is well understood and works that are sensitive or constrained by the weather are programmed into the scheme for the more clement periods of the year. While this is no guarantee of the ability to progress the
works to programme, it does contain a degree of float, making reasonable allowance for some bad weather. In addition, should it be required there are some works that can practically run in a concurrent manner as they’re on different parts of the Complex.

A detailed schedule of all works anticipated to take place over the 3 years of the scheme has been developed to demonstrate that the works are deliverable within the time period of the proposed scheme. This can be found in Appendix B. This programme also shows the works for the full 5 year maintenance programme along with the deferred works from the previous maintenance scheme.

2.8 Inter-dependencies

There are a number of inter-dependencies for the SJBC Major Maintenance Scheme. In summary, these dependencies are as follows:

- Mersey Gateway (opening date)
- Silver Jubilee Bridge, Reconfiguration Works
- Undertaking High Arch Painting

For the purpose of clarity, all of the above works are out of the scope of this scheme and are all funded from other sources. However, each of the above does have a fundamental bearing on the works involved in this scheme.

2.8.1 Silver Jubilee Bridge, Reconfiguration Works

Separate to the Mersey Gateway scheme are a series of works to reconfigure the Silver Jubilee Bridge and its approach roads. The purpose of this is to reduce the carriageway lanes from four to two and also to provide enhanced dedicated cycle and pedestrian facilities within the main parapets of the bridge. These works are scheduled to take place between September 2017 and April 2018 approximately. However, they cannot start until such time as the Mersey Gateway crossing is open to traffic. This does create a strong inter-dependency between the reconfiguration works and progress on Mersey Gateway. However, there is no reason why the SJB Reconfiguration Works can’t take place later after this SJBC Maintenance Scheme, albeit requiring two periods of closure rather than one to complete both sets of works (SJBC Maintenance and Reconfiguration Works). These works are not part of the Mersey Gateway scheme and are to be procured and delivered by the Council so there is complete control over managing the
interface between these works and the Major Maintenance programme. There may be some impact on the ability and timing of implementing the toll regime as the toll facilities are dependent upon the reconfiguration of the approach roads on the Widnes side of the SJB. However, as the Council holds the revenue risk with regard to tolls, there is again control over these decisions. While there may be some loss of revenue, it is anticipated that much of the traffic over the SJB will be local in nature and therefore toll free in any case. It is a revenue risk if the reconfiguration is delayed but it is also a manageable fall-back position should it be necessary.

2.8.2 Mersey Gateway Opening Date

There is clearly a link between when the reconfiguration works can take place and when the MG opens for service. It is considered that painting of the high arch of the SJB can be more safely and affordably undertaken with the bridge closed. However, while it is currently intended to undertake these works during the same period as the Major Maintenance scheme programme, there is no absolute dependency.

As Halton is responsible for procuring and delivering the SJB reconfiguration works (not Merseylink), it has full control over the interface between the two work packages.

2.8.3 Undertaking High Arch Painting (of SJB)

The inter-dependency with the painting of the High Arch of SJB is related to funding. In practical terms, Halton has full control over procurement and delivery of the works. However, the works are funded via deferred monies from the previous major maintenance scheme to remove the backlog of maintenance. Currently, this funding is deferred to the period April 2016 to March 2017 and therefore the works will need to be completed during this period unless agreed otherwise with the Department for Transport. Halton are currently discussing the timing of these works with DfT in the hope of deferring the spend until September 2017 to coincide with the opening of the Mersey Gateway crossing.

2.9 Stakeholders

The Council maintains permanent consultation with a number of key stakeholders when undertaking any works on the SJB Complex. The Council will continue to involve the stakeholders in the development of
this project and particularly with regard to development of any contractual arrangements. The key stakeholders are as follows:

- Highways England
- Emergency Services
- Other Local Authorities
- The Liverpool City Region Combined Authority
- Mersey Gateway Crossings Board
- Merseylink Consortia
- Transport Operators
- Transport related Organisations
- Interest Groups
- British Waterways
- Manchester Ship Canal Company
- Cycling Touring Club
- Public Transport Advisory Panel
- Chambers of Commerce

2.9.1 Consultation

The above organisations have been consulted by the Council as part of the LTP3 process, and will be kept informed of developments during and after the submission of the MSBC. With regard to the Mersey Gateway Crossings Board and Merseylink operator, detailed regular monthly planning meetings will be held to co-ordinate this scheme with the construction of the Mersey Gateway project and manage the interdependencies set out above.

In addition to this, the Council members on Transport Matters and the local MP's are provided with monthly briefing notes on all scheme proposals as they develop. In addition, the Transport and Highways portfolio holder receives weekly updates from the Operational Director (and in this case the Scheme SRO).

The Council has written to all of the stakeholders set out in Section 2.9 as part of the consultation process in specific regard to this maintenance scheme. The responses we have received from the consultees are included in Appendix B. The feedback from stakeholders and consultees confirms there are no objections to our proposed scheme.
The Council also provides a number of forums and opportunities for the public to provide views, feedback and to raise questions with the Council through the following mechanisms;

1. There are opportunities to discuss schemes with the public via Area Forum's and meetings with parish councils every 6 weeks.
2. Regular updates are posted to the Council’s website of major schemes, planned works and planned traffic disruptions
3. A Twitter feed is used to notify residents / followers via social media
4. The Council’s quarterly “in touch “ magazine delivered to all local residents

Finally, the Council undertakes monthly meetings with other Liverpool City Region, Transport Advisory Group members and with neighbouring districts at Operational Director level.

While these works do not require planning approval, this approach by the Council to community involvement and consultation is in line with the Statement of Community Involvement (SCI) set out in the Council’s Planning Policy Framework and ensures the public is informed and notified of schemes and provided with the opportunity to comment on proposals. This approach to consultation will continue throughout the development and delivery of this scheme via the processes mentioned above.

The full strategy for this schemes stakeholder management is set out in Section 7.7 of the Management Case document.

2.10 Scheme Options

Please refer to Section 4 of the attached Options Appraisal Report in Appendix A
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Appendix A. Options Appraisal Report
Silver Jubilee Bridge Complex

Maintenance Funding Options Appraisal Report

March 2014

Halton Borough Council
# Issue and revision record

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<td>Ray Langley</td>
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## Silver Jubilee Bridge Complex

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1. Introduction & Background

1.1 Introduction

Halton Borough Council (HBC) is the authority responsible for maintenance of the strategically important crossing of the River Mersey and Manchester Ship Canal in the form of the Silver Jubilee Bridge and its associated 41 other structures; collectively known as the Silver Jubilee Bridge Complex (SJBC).

HBC wish to secure funding for the future maintenance works required to the SJBC during the 3 year period 2016/2017 – 2018/2019 and, to this end, have gained entry for the SJBC into a long list of schemes being taken forward by transport authorities in the Liverpool City Region and the Liverpool Local Enterprise Partnership.

HBC has commissioned Mott MacDonald to carry out an options appraisal study for maintenance works on the SJBC during the stated 3 year period. The report is the first step in the funding application process and will act as a precursor to a full outline business case for the SJBC.

The report is split into the following sections:
- 1.0 Introduction – Detailing the purpose and layout of the report.
- 2.0 Context – Providing the historical background to the project, a description of the SJBC including its strategic significance in the region, and the current issues faced by HBC in funding the future bridge maintenance.
- 3.0 Method of Generating Options – Discusses the method by which the options set out in subsequent sections have been put together.
- 4.0 Options – Sets out and describes in detail each of the options to be considered.
- 5.0 Appraisal of Options – Describes the approach to assessment and appraisal of the options and goes on to discuss each option and measure its performance against a set of criteria.
- 6.0 Deliverability of Preferred Option – Which provides commentary on how the preferred option will be delivered.
2. Context

2.1 The Silver Jubilee Bridge Complex (SJBC)

The Silver Jubilee Bridge (formerly known as the Runcorn Widnes Bridge) carries the A533 across River Mersey and Manchester Ship Canal between Runcorn and Widnes. The bridge was constructed in 1961 and takes the form of a through arch bridge with a main span of 330m, currently the 30th longest arch bridge in the world. The SJB is designated by English Heritage as a Grade 2 listed structure.

Figure 2.1: Location Plan

Source: Google Earth

The bridge is part of a wider complex of structures which form the bridge approaches and highway structures associated with the crossing. The overall Silver Jubilee Bridge Complex comprises: the Silver Jubilee Bridge itself; the three approach viaducts; eighteen other major highway bridges, eighteen retaining walls and two sign gantries.

A list of the structures is provided below and location plans are contained in Appendix A. A brief description of the structures is provided below.

Most of the associated structures were constructed at the same time as the SJB, together with the approach roads, during the early 1960s. The SJB underwent widening works in 1977 at which time the Runcorn West Approach Viaduct was also constructed.
Silver Jubilee Bridge Complex

Some older structures have also been incorporated in the complex, namely Doctors Bridge (MM ref 14) and Waterloo Bridge (MM ref 20).

2.1.1 **MM ref 01 Ditton Road Interchange North Bridge HBC no. CB 1994**

A three span continuous bridge with a superstructure comprising composite steel beams/reinforced concrete deck. The bridge carries the A533 Queensway over the north side of the A562 Ditton Road Interchange. The bridge will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.2 **MM ref 02 Ditton Road Interchange South Bridge HBC no. CB 1962**

A three span continuous bridge with a superstructure comprising composite steel beams/reinforced concrete deck. The bridge carries the A533 Queensway over the south side of the A562 Ditton Road Interchange. The bridge will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.3 **MM ref 03 Desoto Road East Bridge HBC no. CB 0669**

A two span continuous bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway over Desoto Road and the Timperley-Garston Railway line. The bridge will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.4 **MM ref 04 Desoto Road Railway Bridge HBC no. CB 0111**

A single span bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway slip road over the Timperley-Garston Railway line.

2.1.5 **MM ref 05 Desoto Road Sidings Bridge HBC no. CB 0104**

A two span simply supported bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway slip road over Desoto Road. There are stairs from the A533 to Desoto Road on the east side of the bridge.
2.1.6 **MM ref 06 Hutchinson’s Sidings Bridge HBC no. CB 0499**

A six span simply supported bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway south bound carriageway over a slip road, Dock Road and industrial units.

2.1.7 **MM ref 07 Hutchinson’s Sidings East Bridge HBC no. CB 1654**

A three span continuous bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway north bound carriageway over a slip road, Dock Road and industrial units. The bridge will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.8 **MM ref 08 Widnes Pedestrian Subway HBC no. CB 0623**

A reinforced concrete box subway taking a footway between Irwell Street and Pearl Street beneath the A533 Queensway.

2.1.9 **MM ref 09 Widnes Approach Viaduct HBC no. CB 1706**

A seven span viaduct comprising two three-span continuous spans and one simply supported span on the approach to Silver Jubilee Bridge (SJB). The superstructure comprises a monolithic reinforced concrete beam and slab deck to six spans and composite steel plate girders/reinforced concrete deck on the approach span to SJB. The bridge has been widened to the east side using composite M10 prestressed concrete beams/reinforced concrete deck on the six most northerly spans and using a composite steel plate girder/reinforced concrete deck on the approach span to SJB. The viaduct carries the A533 Queensway on the approach to the north of SJB.

2.1.10 **MM ref 10 Silver Jubilee Bridge (Runcorn-Widnes Bridge) HBC no. CB 1702**

A three span continuous bridge with a 2 pin steel arch central span and side spans of steel trusses. Steel plate cross girders support the composite steel plate girders/reinforced concrete deck. The bridge carries the A533 Queensway over the River Mersey and the Manchester Ship Canal.
2.1.11 MM ref 11 Runcorn Approach Viaduct HBC no. CB 1705

A multi-span viaduct with varying lengths of several continuous spans. The superstructure to all spans except the approach span to Silver Jubilee Bridge (SJB) comprises a monolithic reinforced concrete beam and slab deck. The approach span to SJB comprises composite steel plate girders/reinforced concrete deck. The viaduct carries the A533 Queensway on the approach to the south of SJB.

2.1.12 MM ref 12 Runcorn Approach Viaduct West HBC no. CB 2002

A multi-span viaduct forming the west extension to the Runcorn Approach Viaduct (MM ref 11). The superstructure comprises composite M10 prestressed concrete beams/reinforced concrete deck. The viaduct carries the A533 Queensway over Egerton Road and Lord Street.

2.1.13 MM ref 13 High Street Bridge HBC no. CB 1718

The bridge is a continuation to the south end of Runcorn Approach Viaduct (MM ref 11). It is a two span semi-continuous bridge with a superstructure comprising composite steel plate girders/reinforced concrete deck. There is a subway incorporated in the abutment at the south end of the bridge. The bridge carries the A533 Queensway south bound carriageway over the Bridgewater Canal and High Street.

2.1.14 MM ref 14 Doctors Bridge HBC no. CB 0627

A single simply supported span bridge with superstructure comprising riveted wrought iron haunched girders and deck plate. The bridge carries the B5155 over the Bridgewater Canal.

2.1.15 MM ref 15 Greenway Road Bridge HBC no. CB 1997

A single simply supported span bridge. Available drawings indicate that the superstructure comprises steel filler beams in a voided reinforced concrete deck. However, the appearance of the soffit of the south half of the deck suggests that this section was constructed using prestressed concrete beams whilst the soffit of the north half appears to be an insitu concrete slab with longitudinal grooves. The bridge carries the A533 Daresbury Expressway over Greenway Road.
2.1.16  MM ref 16 Playground Bridge HBC no. CB 1999
A single span simply supported bridge with a superstructure comprising composite prestressed concrete inverted T beams/reinforced concrete infill deck. The bridge carries the A533 Queensway over a link road.

2.1.17  MM ref 17 Picow Farm Road Bridge HBC no. CB 2000
A single span simply supported bridge with a superstructure comprising composite prestressed concrete inverted T beams/reinforced concrete infill deck. Carries the A533 Queensway over Picow Farm Road.

2.1.18  MM ref 18 Station Car Park Road Bridge HBC no. CB 2001
A single span simply supported bridge with a superstructure comprising composite prestressed concrete inverted T beams/reinforced concrete infill deck. The bridge carries an access road to the railway station over Picow Farm Road. Ownership of the bridge is in doubt. The access road carried by the bridge is owned by Network Rail and maintenance of the road and possibly the bridge may be their responsibility.

2.1.19  MM ref 19 Station Road Bridge HBC no. CB 1996
A two span simply supported bridge with a superstructure comprising composite prestressed concrete inverted T beams/reinforced concrete infill deck. The bridge carries Station Road and the A533 Queensway over Daresbury Expressway.

2.1.20  MM ref 20 Waterloo Bridge HBC no. CB 0626
A three span masonry arch bridge that is a Grade II Listed Building. The bridge carries Station Road over the Bridgewater Canal.

2.1.21  MM ref 21 Station Road Footbridge HBC no. CB 1995
A six span footbridge with a superstructure comprising post-tensioned concrete box units. The footbridge provides pedestrian access to Runcorn Station over the A533 Queensway and Daresbury Expressway.

2.1.22  MM ref 22 Chapel Subway HBC no. CB 2060
A monolithic reinforced concrete half round arch structure and base taking a footway beneath the Runcorn Busway.
2.1.23 MM ref 23-01 Ditton Road Toe Retaining Wall HBC no. W46

A monolithic reinforced concrete base and vertical cantilever wall with brick facework supporting the toe of the embankment to the A533 Queensway alongside the north bound slip road at Ditton Interchange. The retaining wall will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.24 MM ref 23-02 Ditton Road West Retaining Wall HBC no. W44a

A reinforced earth retaining wall with a mass concrete retaining wall to the south end supporting the A533 Queensway adjacent to southbound slip road at Ditton Interchange. The retaining wall will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.25 MM ref 23-03 Ditton Road East Retaining Wall HBC no. W44b

A reinforced earth retaining wall with a mass concrete retaining wall to the north end supporting the southbound slip road to the A533 Queensway at Ditton Interchange. The retaining wall will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.26 MM ref 23-04 Desoto Loop Retaining Wall HBC no. W47

A monolithic reinforced concrete base and vertical cantilever wall with brick facework supporting the slip road off the A533 Queensway leading to Desoto Interchange. The retaining wall will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.27 MM ref 23-05 BCR Retaining Wall HBC no. W43

A reinforced earth wall with a reinforced concrete return wall at the north end supporting the A533 Queensway south bound carriageway adjacent to the old British Copper Refiners (BCR) premises. The retaining wall will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.
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<td></td>
<td>A concrete retaining wall supporting the A533 Queensway adjacent to the north bound slip road just to the north-west of Station Road Bridge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.30</th>
<th>MM ref 23-08 Queensway South-East Retaining Wall HBC no. W11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A brick faced concrete retaining wall supporting the A533 Queensway adjacent to Waterloo Bridge.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.31</th>
<th>MM ref 23-09 Railway Viaduct Retaining Wall HBC no. W13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A concrete retaining wall supporting the railway car park to the south-east of Station Road Bridge adjacent to Runcorn Expressway.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.32</th>
<th>MM ref 23-10 Playground Retaining Wall HBC no. W10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A concrete retaining wall supporting the A533 Queensway north bound carriageway adjacent to the north-west corner of Playground Bridge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.33</th>
<th>MM ref 23-11 Desoto Road Railway NW Embankment Retaining Wall HBC no. W171</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The stem to the retaining wall is brick but otherwise the construction of the retaining wall is unknown. There is a separate brick parapet wall alongside the carriageway to the rear of the retaining wall. The retaining wall supports the west side of the slip road from the A533 Queensway to Ditton Road Interchange.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.1.34</th>
<th>MM ref 23-12 Desoto Road Railway NE Retaining Wall HBC no. W130</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A piled monolithic reinforced concrete base and vertical cantilever wall and brick parapet supporting the east side of the slip road from the A533 Queensway to Ditton Road Interchange</td>
</tr>
</tbody>
</table>
2.1.35 **MM ref 23-13  Hutchinson’s Sidings Slip W Retaining Wall HBC no. W114**

The stem of the retaining wall is apparently of brick construction that has subsequently been faced with concrete, presumably as part of previous repair works. Otherwise the construction of the wall including foundations is unknown. The retaining wall supports the west side of the slip road from the A533 Queensway to Widnes Easterly Bypass just to the south of Hutchinson’s Sidings Bridge.

2.1.36 **MM ref 23-14  Waterloo NE Retaining Wall HBC no. W160**

A brick faced concrete retaining wall but details of the foundations are unknown. The retaining wall supports the east side of the A533 Queensway between the north abutment of Desoto Sidings Bridge and the south abutment of Desoto Road Railway Bridge.

2.1.37 **MM ref 23-15  Desoto Road Sidings NE Retaining Wall HBC no. W131**

A brick faced concrete retaining wall but details of the foundations are unknown. The retaining wall supports the east side of the A533 Queensway between the north abutment of Desoto Sidings Bridge and the south abutment of Desoto Road Railway Bridge.

2.1.38 **MM ref 23-16  Ditton Road SW Slip W Retaining Wall HBC no. W145**

A concrete retaining wall but otherwise the construction of the wall including foundations is unknown. The retaining wall is located at the south end of Desoto Road Railway NW Embankment Retaining Wall and supports the west side of the slip road from the A533 Queensway to Ditton Road Interchange.

2.1.39 **MM ref 23-17  Hutchinson’s Sidings Slip East Retaining Wall HBC no. W112**

A concrete retaining wall but otherwise the construction of the wall including foundations is unknown. The retaining wall supports the A533 Queensway above the east side of the slip road from the A533 Queensway to Widnes Easterly Bypass just to the south of Hutchinson’s Sidings Bridge. The retaining wall is to the south of and continuous with Hutchinson’s Sidings Slip East Stair Retaining Wall.
2.1.40 MM ref 23-18 Hutchinson’s Sidings Slip East Stair Retaining Wall HBC no. W113

A concrete retaining wall but otherwise the construction of the wall including foundations is unknown. The retaining wall supports the A533 Queensway above the east side of the slip road from the A533 Queensway to Widnes Easterly Bypass just to the south of Hutchinson’s Sidings Bridge. The wall incorporates concrete stairs from the A533 down to the slip road. The retaining wall is to the north of and continuous with Hutchinson’s Sidings Slip East Retaining Wall.

2.1.41 MM ref 24-01 Desoto Gantry HBC no. CB 2179

A structural steel gantry on reinforced concrete spread footing foundations over the A533 Queensway north bound and off slip road to the south of Desoto Road. The gantry will be removed as part of the current plans for the proposed road scheme to the north of the Mersey Gateway Crossing.

2.1.42 MM ref 24-02 Hutchinson’s Gantry HBC no. CB 2158

A structural steel gantry on reinforced concrete spread footing foundations over the A533 Queensway north bound carriageway to the south of Hutchinson’s Sidings East Bridge.

2.2 SJBC History

The SJB replaced the Widnes-Runcorn Transporter Bridge, originally opened in 1905 as the first vehicular crossing of the Mersey in the Runcorn and Widnes area.

Following recognition by the Ministry of Transport that the Transporter Bridge had become inadequate for the amount of traffic using it, work on the SJB began in 1956 and was completed in 1961.

Most of the associated structures were also constructed at the same time including the 328m Runcorn Approach Viaduct and 152m Widnes Approach Viaduct.

As a direct result of the SJB construction, trade in Runcorn increased six fold between 1960 and 1970, consequently increasing traffic usage of the SJB dramatically. In response, the SJB was widened in 1977 to carry four lanes of traffic. At this time the Runcorn West Approach Viaduct extension was also constructed.
The SJBC has undergone much repair work since construction, which is discussed further in section 3, but has not undergone further extension or expansion.

2.3 SJBC Strategic Significance in the Region

The SJBC provides the only road crossing of the River Mersey between Warrington and Liverpool, a total distance of over 25km.

It is a key transport link for Liverpool John Lennon Airport used by over 5 million passengers each year.

The SJBC is used by an estimated 80,000 vehicles per day with significant congestion experienced at peak times. Any restriction on the capacity of the structures could lead to lanes closures and result in severe congestion in the surrounding area and North West England.

The number of Job Seeker’s Allowance claimants in Halton is higher than the regional and national rate (see table 2.1). Therefore ensuring that transport supports access to employment is an important challenge for the local travel network. Improvements to the Silver Jubilee Bridge are vital to ensuring that people can access employment opportunities on both sides of the River Mersey. The bridge provides essential access to investment sites outlined in the SEP, which will provide employment opportunities over the coming years (see map 2.2). An accessible local transport network that connects residential areas with employment sites is essential to addressing deprivation and social exclusion.

Table 2.1: All people claiming JSA in Halton (2009-2014)

<table>
<thead>
<tr>
<th>Date</th>
<th>Halton</th>
<th>Halton (%)</th>
<th>North West (%)</th>
<th>Great Britain (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb-14</td>
<td>3,297</td>
<td>4.1%</td>
<td>3.4%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: Nomis (2014)

Halton suffers from low car ownership, particularly in the areas surrounding to the Silver Jubilee Bridge (see map 1). In the Riverside area close the bridge, between 45.2 and 58.7% of residents do not own a car or van compared to North West average of 28% (see table 2.2). Low car ownership often results in poor access to key services and opportunities and reduces travel horizons.
Table 2.2: Car availability to households in the North West (1995-2012)

<table>
<thead>
<tr>
<th>Year</th>
<th>No car/van</th>
<th>One car/van</th>
<th>Two or more cars/vans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/12</td>
<td>28%</td>
<td>43%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Source: DfT (2013)

Map 2.1: Percentage of residents without car/van ownership

Source:
http://www3.halton.gov.uk/ignl/pages/86821/186649/187460/187527/Figure20.13.pdf

Public transport is essential for those who have do not own a car or van to access employment, education and leisure. The Silver Jubilee Bridge is an essential link for those trying to access sites of opportunity via public transport on both sides of Halton. Table 2.3 indicates that a high number of residents in the North West use a bus or coach to travel work. Therefore bridge maintenance will help to increase the number of buses that are able to use the bridge to facilitate mobility for those who do not have access to a car. This is essential to connect areas of high deprivation and employment sites through public transport.
Table 2.3: Usual method of travelling to work in the North West (2009-2010)

<table>
<thead>
<tr>
<th></th>
<th>Car</th>
<th>Bicycle</th>
<th>Bus / coach</th>
<th>Rail</th>
<th>Walk</th>
<th>Other modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>71%</td>
<td>3%</td>
<td>8%</td>
<td>3%</td>
<td>12%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: DfT (2013)

Map 2.2: IMD 2010 Rank and key employment sites in Halton

Source: Mott MacDonald

2.4 Halton Borough Council

Halton Borough Council (HBC) is the maintaining authority for all of the structures within the SJB Complex, taking on the role previously undertaken by Cheshire County Council on the 1 April 1998.

This places HBC in a unique position as the only local authority in the UK with sole responsibility for a bridge complex structure of the scale of the SJBC.

In the period 1999 – 2007 a number of reports commissioned by HBC highlighted the deteriorating condition of the SJBC (discussed further in section 3) and the absolute need for large scale repair and maintenance works to avoid partial or total closure of sections of the bridge and associated structures.
In 2010 the Secretary of State for Transport granted approval for a five year programme of grant funding totalling £18.6m commencing in 2011. This funding has been used undertake significant maintenance work to the SJBC and return the structures to a condition where only steady state maintenance should be required.

The SJBC does, however, continue to represent a significant liability for HBC and as will be demonstrated in subsequent sections, the scale of maintenance works required to maintain a steady state are beyond the funding available to HBC from their bridges and highways budgets.

2.5 Impact of the Mersey Gateway (MG) Crossing

In late March 2007 the Transport Secretary approved the Mersey Gateway Scheme for entry into the national programme of major schemes. Conditional funding was awarded to the project in 2011 and in March 2014 the Government announced guaranteed funding of up to £270m.

The Project is being procured as a privately financed Public Private Partnership project. In June 2013 the Merseylink Consortium was appointed as the Council’s preferred bidder, and it is now working closely with the council to finalise the legal, financial and design arrangements for the project.

The project is expected to be completed by 2017.

The current preferred alignment for the Mersey Gateway Crossing is up-stream of the existing crossing, connecting with the A562/A533 at Ditton Interchange.

As part of this process, the SJB will be ‘de-linked’ from the main network to provide a crossing route for local through traffic only. This will require a major remodelling of the highway layout in this area. Ditton Road Interchange North and South Bridges, Desoto Road East Bridge and Ditton Road East and West Retaining Walls will be significantly affected as a result; in addition the Runcorn Approach Viaduct, High Street Bridge and the Silver Jubilee Bridge Footbridge will also be affected. Other than this, the structures within the SJB Complex may not be significantly affected by the proposed new crossing.

Although the new crossing will go a long way to ease congestion in the area and lessen the burden on the Silver Jubilee Bridge it does not negate the need for a Maintenance Strategy Plan. The SJBC will still
Silver Jubilee Bridge Complex

form an intrinsic part of the highway network, with both crossings working together to provide the best possible network solution. The new crossing will be used for ‘through traffic’ with the Silver Jubilee Bridge being retained to serve local traffic for Runcorn and Widnes. The route via either the SJBC or via the Mersey Gateway Crossing could each be utilised as a temporary diversion during any periods of maintenance to the other route, for example highway resurfacing. The SJB is the sole means of accommodating pedestrian and cyclist demand across the river and it is therefore important that this provision is maintained.
3. Method of Generating Options

3.1 Review of Previous Information

HBC has previously commissioned MM to carry out several structural maintenance studies on the SJBC which have been reviewed as part of this study.

3.1.1 1999 Report

In 1999 a report was issued which considered all of the twenty two bridges now contained within the SJBC but only ten of the retaining walls and neither of the gantries. It gave a summary of all the anticipated maintenance work and investigations required on each structure for the ten years from 1999/2000 to 2008/2009 in order to reach a ‘steady state’ of maintenance. Cost estimates and prioritisation of the maintenance and investigation work required on each structure were also provided. The report also emphasised the structural deterioration that would occur and the disruption to the highway network if the then present level of maintenance under-funding continued. This report was used to support an application for funding from the Department for Transport (DfT).

Over the period since 1999-2003, several maintenance contracts exceeded their estimates, in some cases considerably. This arose for several reasons. The complexity of the main Silver Jubilee Bridge may not have been fully appreciated at the time the original estimates were prepared. However, a key issue was the cost of maintaining traffic flow on this important strategic route via traffic management arrangements or use of night-time working.

As a result, not all the maintenance work originally programmed was undertaken and as a consequence the original programme became unachievable.

3.1.2 2003 Report

In 2003 HBC commissioned MM to investigate the maintenance work completed and that still outstanding. That study culminated in a report entitled “Silver Jubilee Bridge Complex: Maintenance Strategy Report 2003” dated July 2003. The 2003 report was considered an interim measure prior to the production of a revised report produced by Mott MacDonald in May 2004 which updated the original 1999 report and extended it in light of greater knowledge acquired at the time, covering the period from 2005/2006 to 2014/2015.
In the two years that followed some of the anticipated maintenance work was carried out; however, the majority of the anticipated work for this period was postponed due to lack of funding.

3.1.3 2007 Report

A 2007 report updated the May 2004 report, presenting a revised and updated maintenance strategy for the period from 2007/08 to 2016/17, taking into consideration the maintenance work already carried out, and the revised priority status of some of the structures due to the possible impact of the Mersey Gateway crossing. The opportunity was also taken to revise cost rates from a 2003 baseline to 2007, to ensure that the figures remained relevant for ongoing budgeting purposes.

In late 2007, as part of the DfT’s LTP announcement, it was confirmed that HBC had been awarded Primary Route Network Grant funding totalling £14.3m for three years commencing 2008/09 which in addition to other funding sources would allow the Council to address the first four years of work identified in the maintenance strategy in the 2007 report.

This report also led to secured funding in 2010 from the Secretary of State of £18.6m to complete the remaining maintenance works highlighted in the later years of maintenance strategy commencing 2011/12. The funds have been used by HBC to undertake significant maintenance works to remove the backlog of required works and return the SJBC to a position where only steady state maintenance activities should be required on subsequent years.

3.2 Update and Production of Maintenance Schedules

3.2.1 Maintenance in the Period 2016/2017 – 2018/2019

The works highlighted in the 2007 report are understood to have largely been completed, however some works are currently ongoing, scheduled to be carried out in 2014 or deferred until completion of the Mersey Gateway crossing.

The first task in preparation of this Options Appraisal Report has been to review the existing maintenance schedules for the SJBC against records of work carried out since 2007 held by HBC.

Update of the schedules for the 3 years in question has been undertaken in collaboration with HBC and resulting 2014 schedules produced are contained in Appendix B.
The schedules list out any works not completed or due for completion before 2015 and that are therefore left over from the previous maintenance schedule. These items are, however, limited and the majority of the items contained in the new schedules are those considered necessary to maintain a steady state maintenance.

For each item listed, a brief description of the work is provided together with implications of the work such as the requirement for lane closures and the estimated annual cost.

Notes on the method by which costs have been assessed are provided in section 3.2.4

### 3.2.2 Risk Items

A schedule has been produced that lists out items not considered to be required as part of a routine maintenance regime, but may need to be addressed due to a localised failure of part of the structures or an unexpected event.

Risk items have been noted with a percentage likelihood to represent the chance of the work being required during the period 2016/2017-2018/2019. Further discussion on the incorporation of risk into the funding application is provided in the options section.

There are some risk items that are considered too extreme to reasonably include in this schedule, namely:
- Any need to replace the SJB hangers identified following further investigation
- Any requirement for scour protection or underpinning to foundations
- Any strengthening to bridges required to provide capacity for increased loads that may be requested during the 10-year period (e.g. abnormal load vehicles other than those currently assessed for the structures)

It is considered unreasonable to include the these items in risk consideration as they would seriously distort the estimates. It is therefore felt that if such exceptional circumstances arose they would have to treated as special cases with special applications for funding being made.
3.2.3 Assumptions

3.2.3.1 Mersey Gateway

This report aims to consider options for maintenance works to the SJBC over the period 2016/17-2018/19. Although the Mersey Gateway is due to be operational in 2017 a detailed programme is not yet available and there is a realistic possibility of delays occurring.

The most significant effect of the Mersey Gateway on the SJBC will be a reduction in usage. However the majority of maintenance items in the schedules are not dependant on usage (the main exception being re-surfacing works) and therefore timescales and extent of work required will not be altered due to the opening of the gateway crossing.

When the Mersey Gateway is operational, the SJB will remain an important part of the regions infrastructure solution acting as a local link between Runcorn and Widnes and serving to provide an alternative crossing route should closure of the Gateway be required.

For these reasons, the opening of the Mersey Gateway is assumed to not affect the maintenance requirements of the SJBC in the period 2016/17-2018/19.

3.2.3.2 Deferred Items

Several maintenance works items in the 2007 report have intentionally been deferred as to carry out these works lane closure on the SJB would be required. It was therefore decided that it would be more appropriate to carry out these works once the Mersey Gateway crossing is operational and the SJB could be completely closed to traffic.

For this report it has been assumed that the funding for these items has been secured as part of the 2010 granted sum of £18.6m and that this funding has been deferred until works can be carried out. As such a new funding source does not need to be sought as part of the current application and they are not included in the schedules presented in this report.

3.2.4 Method of Costing

For each maintenance item, an estimate of cost has been provided, generally presented as a cost per annum. To estimate these costs, the rates for work carried out by Balvac Construction Limited during the
maintenance carried out on the SJB in the period 2011-2014 have been used as a benchmark.

The cost rates include for contractor preliminaries, overheads and profit as well as client design costs and an allowance for uncertainty in the extent of work estimated. This has led to an uplift of 50% being included on the base cost rates applied for individual works.

As the works noted in this report are scheduled to be carried out in the period 2016-2019, an inflation index of 3.5% pa has been applied to reflect the likely increased future cost.

Pricing of risk has also been undertaken and this is discussed further in the options presentation section of this report.

It should be noted that all costs are estimates and as such are subject to a degree of uncertainty. Whilst every effort has been made to provide accurate realists prices, there remains the possibility that actual market tested prices will vary from these figures.

3.3 Production of Options

The schedules discussed in the previous section have been used to form the basis of the options for consideration and review in this report. Options have been formed as follows:

3.3.1 Option 1 ‘Do Nothing’ - Bridges Block Allocation

The first option of ‘Do Nothing’ assumes that HBC are only able to use available funds from their bridges block allocation of £600,000 per annum to finance the maintenance works. This means that a very limited amount of the scheduled maintenance works can be carried out and consideration will be given to which items are of highest priority.

This option will demonstrate the consequences of a lack of maintenance works to the complex, the implications for the local transport network and the increased backlog maintenance liability in 2019.

3.3.2 Option 2 ‘Do Minimum’ - Bridges and Highways Block Allocation

The option considers the possibility of HBC diverting part of their highways block allocation to supplement the bridge block allocation.
This enables more of the scheduled maintenance items to be undertaken but will still leave some items unaddressed.

This option will demonstrate the outcome of HBC utilising all funding currently available to them on the SJBC.

**3.3.3 Option 3 ‘Do all with no risk consideration’**

This option looks at the situation where additional funding is secured for the maintenance works required but, in addition, items included in the risk register are considered and allowed for.

This allows the opportunity to explore the likely consequences of not considering these risk items in the future maintenance regime.

**3.3.4 Option 4 ‘Do all with risk considered’**

The option assumes that all schedule items are undertaken through extra funding secured as for option 3. In addition, the items presented in the risk schedule are considered and a suitable method of incorporation into the funding application is presented.

This option will demonstrate how risks can be appropriately considered and funds allowed to help mitigate any impact of their realisation.

**3.4 Presentation of Options**

For each option presented, the following have been considered:

**3.4.1 Works Covered**

This section will list the items from the maintenance schedules in Appendix B that will be carried out as part of the works in the option presented.

**3.4.2 Cost**

The cost of the option presented

**3.4.3 Structural Implications**

This section will discuss the significant structural implications likely to arise due to the works not being undertaken as part of the option presented.
In the context of the SJBC, a significant structural implication is considered to be any deterioration or failure which either directly, or indirectly as the result of repair/maintenance works required, causes the closure of part or all of the road network supported by the SJBC.

It should be noted that timescales and extent of impacts presented are estimates based on experience of similar bridge structures and knowledge of the SJBC.

3.4.4 Estimated Future Yearly Maintenance Costs

In addition to the likelihood of implications noted in the preceding section, lack of maintenance works to the SJBC would lead to the general deterioration of all those structure for which maintenance items have not been addressed.

Inevitably this means that with each year that passes where maintenance works have not been undertaken, the cost of those maintenance works will increase due to the increased scope required to return to return the area to a good condition.

This section will present estimates for the backlog maintenance costs built up due to the lack of attention to some maintenance items during the period 2016/17-2018/2019.

3.4.5 Impact on Risk

A schedule has been produced which lists risk items that may occur during the period being considered. The extent to which general maintenance work is carried out has an impact of the likelihood of each of these risks, which is discussed for each option.

3.4.6 Other Implications

Other implications not covered by the previous sections are set out and discussed. These include impacts on the local transport network.
4. Options

4.1 Option 1 ‘Do Nothing’ – Bridges Block Allocation

At present, HBC have an annual bridge block allocation of £600,000 per annum. This sum is required to cover maintenance works to 274 bridges, culverts, subways and retaining walls in the Halton region.

The SJBC is the most significant group of these structures both in terms of physical size and strategic importance. It is therefore assumed that approximately £400,000 of the block allocation could reasonably be spent on the SJBC maintenance works, with the remaining £200,000 reserved for other structures in Halton.

For this option it is assumed that this is the only funding available to HBC and no further funding is secured as part of future funding applications.

4.1.1 Works Covered

As this option allows for a budget below that required to undertake all maintenance works listed, to determine the most important items to be addressed three key factors have been considered.

1. The time until first significant impact
2. The significance of the impact
3. The significance of the affected structure to the functionality of the SJBC

This analysis of the items has led to the following being selected as the most significant maintenance items:

- 2016/17
  1. Technical Support for Cathodic Protection System
  2. Special Inspection of Lower Hanger Cables
  3. Principal Inspection of Underdeck Steelwork Suspended Span
  4. East Parapet Replacement and Cantilever Strengthening
2017/18

1. Technical Support for Cathodic Protection System
2. Special Inspection of Lower Hanger Cables
3. Principal Inspection of Underdeck Steelwork Suspended Span
4. Approximately 50% of Scheduled Painting Works

2018/2019

1. Technical Support for Cathodic Protection System
2. Special Inspection of Lower Hanger Cables
3. Principal Inspection of Underdeck Steelwork Suspended Span
4. Principal Inspection to Spandrel Steelwork
5. Principal Inspection to Arch
6. Principal Inspections to Other Bridges in Complex

It is therefore considered reasonable to assume that HBC would use the £400,000 per annum funding to undertake these key works and leave the remainder of the maintenance work unaddressed.

4.1.2 Cost

The yearly cost of this option is as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/17</td>
<td>£402,000</td>
</tr>
<tr>
<td>2017/18</td>
<td>£400,000</td>
</tr>
<tr>
<td>2018/19</td>
<td>£363,500</td>
</tr>
</tbody>
</table>

The entirety of this cost would be met by HBC’s existing funding.
4.1.3 **Structural Implications**

From the remaining items left unaddressed, the first items likely to lead to a significant impact event are the postponement of painting and resurfacing works.

A lack of painting work to the SJBC structures will lead to increased corrosion of steelwork and therefore an increased chance that a failure could occur.

Road surfaces are considered to be in a state such that a lack of resurfacing work would lead to road or lane closure in approximately 10 years’ time.

4.1.4 **Estimated Future yearly maintenance costs.**

In addition to the likelihood of the highway closures noted in the preceding section, the lack of maintenance works to the SJBC would lead to the general deterioration of all those structures for which maintenance items have not been addressed.

Inevitably this means that with each year that passes, where maintenance works have not been undertaken, the cost of those maintenance works will increase due to the increased scope required to return to return the area to a good condition.

The backlog of maintenance work that would need to be addressed in the years following the 3 years considered in this report can be quantified by summing the items left unaddressed from Appendix B. The backlog maintenance figure is therefore: £2.6 million.

4.1.5 **Impact on Risk**

In addition to the lack of attention to the majority of maintenance items leading to increased future costs, this will also increase the chance of an item in the risk schedule being realised.

This is because a lack of maintenance will lead to advanced deterioration of structures. The greater the rate of deterioration, the sooner a particular structural item or system will reach a point where it may fail. Hence, an increased probability of this occurring during the period 2016/17-2018/19 or beyond.
4.1.6 Other Implications

It is assumed that the residual £200,000 of the bridges block allocation would be sufficient to cover maintenance and repair works to the other 228 structures within the Halton region. However, restriction on the use of the SJBC due to lane closures has potential to impact on the local transport network.

A closure of part or all of the SJBC represents a concern to local interests as the local highway network is dependent on a limited number of alternative routes. As described earlier, the SJB plays a vital part in the delivery of the Mersey Gateway Sustainable Travel Strategy (MGSTS) to deliver a local sustainable option to the residents of Halton. The severance caused by the loss of the link could act as a barrier to the local residents by reducing accessibility to a range of employment, education, healthcare, leisure, recreational and other essential services.

The consequences of a full closure of the SJB are that although the main MG bridge could accommodate the additional demand from the 20% of vehicular trips reassigned from SJBC, public transport routes could be less direct and potentially more costly and there would be no reasonable means of accommodating cross river non-motorised user demand. As with other major strategic links, utilities will not be carried over MG bridge. SJB currently carries a number of key utilities over the Mersey, i.e. gas, cable, (virgin media) etc. In this respect, the structural integrity of the SJB is relied upon to carry:

i) gas supply which homes and businesses in Halton depend upon.

ii) Fibre-optic cable which is key to the prospering local ‘knowledge economy.’

4.2 Option 2 ‘Do Minimum’ - Bridges and Highways Block Allocation

The £600,000 per annum bridges block allocation is part of a total HBC Highway Maintenance Block allocation of £1.565 million per annum. This is used to address capital maintenance of all highway infrastructure including structures, carriageways, footways, cycleways and lighting.

If absolutely unavoidable, HBC could divert a portion of the highways and lighting allocation to the bridge allocation to supplement maintenance funding for the SJBC.
This option assumes that the £400,000 considered in option 1 is supplemented by the remaining £200,000 or the bridge block allocation and £400,000 of the Highways and Lighting allocation to give a total fund of £1 million per annum

4.2.1 Works Covered

The increased maintenance budget would allow the following items to be addressed, in addition to those covered in option 1:

- 2016/2017
  1. Runcorn Trestle Maintenance Painting
  2. SJB Main Span Footway Stringer Refurbishment.
  3. Replacement of Parapets
  4. Painting Works to Complex Structures.
  5. Replacement of Expansion Joint N6
  6. High Street Bridge Works
  7. Waterloo Bridge Works

- 2017/2018
  1. Runcorn Approach Viaduct Principal Inspection
  2. Hutchinson’s Bridge Underdeck Painting
  3. Doctor’s Bridge Principal Inspection and Painting
  4. Waterloo Bridge Painting
  5. Approximately 50% of Resurfacing, Waterproofing and Deck Repairs to Greenway Road Bridge and Doctors Bridge.

- 2018/2019
  1. Approximately 65% of Resurfacing, Waterproofing, Expansion Joint and Deck Repairs to Station Rd Bridge, Picow Farm Bridge, Playground Bridge.

4.2.2 Cost

The yearly cost of this option is as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/17</td>
<td>£981,940</td>
</tr>
<tr>
<td>2017/18</td>
<td>£1,000,000</td>
</tr>
<tr>
<td>2018/19</td>
<td>£1,000,000</td>
</tr>
</tbody>
</table>

The entirety of this is cost would be met by HBC’s existing funding.
4.2.3 Structural Implications

The increased budget for this option allows the majority of the significant painting works to be addressed during the period. However, the funds would not allow the full extent of resurfacing works to be undertaken.

This means that, for the areas where resurfacing has not taken place, lane or road lanes could still be expecting in 10 years’ time. The closures would be routes or lanes of lesser importance in the SJBC though, as it can be expected that the funds available would be used to address those of most critical importance.

4.2.1 Estimated Future yearly maintenance costs.

As for option 1, in addition to the likelihood of the highway closures noted in the preceding section, the lack of maintenance works to the SJBC would lead to the general deterioration of all those structures for which maintenance items have not been addressed.

Although this may be less far reaching than option 1, still with each year that passes where maintenance works have not been undertaken, the cost of those maintenance works will increase due to the increased scope required to return to return the area to a good condition.

The backlog of maintenance work that would need to be addressed in the years following the 3 years considered in this report can be quantified by summing the items left unaddressed from Appendix B. The backlog maintenance figure is therefore: £780,490

4.2.2 Impact on Risk

In addition to the lack of attention to the majority of maintenance items leading to increased future costs, this will also increase the chance of an item in the risk schedule being realised.

This is because a lack of maintenance will lead to advanced deterioration of structures. The greater the rate of deterioration, the sooner a particular structural item or system will reach a point where it may fail. Hence, an increased probability of this occurring during the period 2016/17-2018/19 or beyond.
4.2.3 Other Implications

As the all of bridge block funding would be spent on maintenance works to the SJBC, no funding would be left to cover maintenance and repair works to the other 228 structures within the Halton region.

Many of these structures are similar in type to the associated structures in the SJBC, we can therefore assume that similar maintenance works would be required. We can then say that the other structures within HBC responsibility would deteriorate due to lack maintenance funding leading to potential road closures in 10 years’ time and increased future maintenance costs in a similar way to the SJBC itself.

In addition, funding for highways, cycleways, footways and lighting would now also be greatly reduced, similarly leading rapid deterioration of carriageway and footway condition ultimately with potential road closures and a significant build up of backlog maintenance due to a lack of attention to road surfacing, maintenance and repair.

When this is considered alongside the potential for SJBC road or lane closures as noted in section 4.2.3, it quickly becomes apparent that in the next 10 - 20 years there could be extensive and regular disruption to the Halton region’s already overloaded road network.

4.3 Option 3 ‘Do all with no risk consideration’

This option assumes that additional funding is secured for all items noted in the maintenance schedule, but all risk items are excluded from the consideration. The maintenance works are funded from £400,000 per annum of the bridge block allocation and £850,000 per annum of additional funding.

4.3.1 Works Covered

All items in the maintenance schedule would be carried out with the exception of those listed as risk items.

4.3.2 Cost

The yearly cost of this option is as follows:
Table 4.3 Option 3 Yearly Maintenance Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/17</td>
<td>£1,208,590</td>
</tr>
<tr>
<td>2017/18</td>
<td>£1,261,000</td>
</tr>
<tr>
<td>2018/19</td>
<td>£1,268,500</td>
</tr>
</tbody>
</table>

4.3.3 Structural Implications

As the maintenance schedules have been complied to ensure that a steady state of maintenance is maintained, we can say that there should be no structural implications due to lack of attention to any of the items within the schedules.

Structural implications will instead result from realisation of one or more of the risk items. The period considered in this report is 2016/17-2018/19, which is a short period in the lifetime of a bridge. The likelihood of risk items occurring during this item is therefore low, however the consequences of the risk occurring is in some cases considerable. These are discussed individually below:

4.3.3.1 Footway Girder Repairs, SJB

Repairs have had to be undertaken to previously identified locations. There is a risk that new additional locations will be identified during forthcoming routine inspections.

Left unattended, these defects could lead to the temporary closure of the Complex until repairs are undertaken.

4.3.3.2 Steelwork Repairs

It is possible that the need to repair sections of the SJB steelwork will arise due to either damage from accidents or general decay. Based on previous experience of SJB the highest likelihood that steelwork repairs will be required will be in the areas near joints affected by the highway ‘splash’ zone. The risk will be increased if regular minor maintenance of the paint system is not undertaken.

Repair works are likely to require high level access to the bridge with lane closures being required.
4.3.3.3 Cathodic Protection Repairs

As part of the works funding by the 2011 grant, the existing cathodic protection system was extended and upgrading across the SJB. The system ensures that degradation of the concrete elements of the bridge is controlled and so failure of the system could result in extensive deterioration of large areas of the bridge.

Damage to the CP system could occur in several ways for example a loose redundant cable of the variety found on SJB breaking loose and blowing in the wind dislodging a CP cassette.

Although repair of the cathodic protection system may not require lane closures, access to the deck soffit would be needed via roped access, scaffolding or MEWP.

4.3.3.4 Concrete Repairs

This item covers concrete repairs that may be required to the SJB.

The consequences of the required repair vary highly and depend partly on the cause of the defect. Lane closures may be possible if the repair is required to an area either directly forming or supporting the roadway.

4.3.3.5 Bearing Replacement

The SJB contains numerous rocker, pot or elastomeric bearings that support the various superstructures. These bearings either date from original construction (1961) or the widening (1977). Common practice was to design bearing for replacement after 50 years, i.e., 2011 or 2027.

Bearing replacement would necessitate speed restrictions, lane closures and possibly weight restrictions throughout the complex.

4.3.4 Estimated Future Yearly Maintenance Costs

As the full maintenance works will have been addressed the future costs of routine maintenance works should not increase above inflation. This assumes that no risk are realised, as were this the case, funding would need to be diverted from the routine works to the risk item works. The incomplete item(s) from which funding was taken would lead to increase future maintenance costs.

The backlog maintenance sum would therefore be zero.
4.3.5 Impact on Risk

The completion of the schedules of required maintenance works will mean that a lack of maintenance should not lead to an increased risk profile at the end of the period 2016/17-2018/19.

However, if no allowance is made for the risk items themselves then two situations could lead to an increased risk profile:

1. If a risk is realised, the funding for the necessary works would need to be taken from those allocated to the routine work. The incomplete repair work as a result of the diverted funding would increase the chance of a risk item occurring on the section of the SJBC left unattended to.

2. Several of the risk items are related to deterioration of part or parts of the SJBC over time. This means that inherently the likelihood of the risks occurring increases with time. If no allowance is made for risk in the current period, at the end of this period there will be an increased risk profile, with no contingent fund to cover.

4.3.6 Other Implications

Residual Bridge Block allocation funding is assumed to be sufficient for the maintenance of other structures in the Halton Region and all routine maintenance works to the SJBC will be undertaken. There should therefore be no significant implications for the Halton region road network due to these items.

As discussed above though, realisation of the majority of the risk items would lead to road closures. Whilst this would be the case whether or not funding was allowed for risk items, a lack of funding available to resolve the issue would increase the period of time for which the closure is in place indefinitely.

4.4 Option 4 ‘Do All with risks considered’

This option assumes that funding is secured for all items noted in the maintenance schedules, and consideration is given to risk items. The works are funded from £400,000 of the bridge block allocation and £1,100,000 of additional funding.
4.4.1 Works Covered

All items in each of the maintenance schedules are carried out.

Risk items have been considered by applying a percentage likelihood to each item based on the chances of occurrence during the period 2016/17-2018/19. The percentage likelihoods have been multiplied by the cost of the risk item and then summed to give a total figure representing a likely sum that will be required to cover the risk schedule.

4.4.2 Cost

The yearly cost of this option is as follows:

Table 1. Option 1 Yearly Maintenance Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016/17</td>
<td>£1,461,090</td>
</tr>
<tr>
<td>2017/18</td>
<td>£1,513,500</td>
</tr>
<tr>
<td>2018/19</td>
<td>£1,521,000</td>
</tr>
</tbody>
</table>

4.4.3 Structural Implications

As the maintenance schedules have been compiled to ensure that a steady state of maintenance is maintained, we can say that there should be no structural implications due to lack of attention to any of the items within the schedules.

Also, as provision has been made for risk items based on probability, there should be no significant structural implications due to the realisation of a risk other than those which are unavoidable due to the nature of a particular risk.

Significant structural implications would only be expected in the unlikely event that several of the risk items occurred together, beyond the allowance made by the probabilistic assessment.

4.4.4 Estimated Future yearly maintenance costs.

As the full maintenance works will have been addressed the future costs of routine maintenance works should not increase above inflation.

Similarly the inclusion of allowance for risk, will mean that it is unlikely that funds would need to be diverted from routine items to risk items.
The backlog maintenance sum would therefore be zero.

4.4.5 Impact on Risk

The future risk profile should not be increased due to a lack of attention to either routine maintenance or allowance for risk.

In the event that risk items are not realised, the funding for these items could be retained as future contingency to offset any increased likelihood of occurrence due to deterioration.

4.4.6 Other Implications

As allowance has been made for all maintenance works and some elements of risk and only reasonable funds have been diverted from HBC block allocations, wider implications in the Halton region are not expected.

Significant impacts might only occur in the event that several risk items, in excess of that allowed for, occur in the period 2016/17-2018/19.
5. Appraisal of Options

5.1 Approach to Assessment

The options presented in section 4.0 have been assessed based on the following:

- Cost,
- Extent of structural implications,
- Effect on backlog maintenance costs,
- Effect on risk profile,
- Other impacts on the Halton Region.

5.2 Assessment of Options

The following table provides a summary of the options in relation to the assessment criteria outlined above:

<table>
<thead>
<tr>
<th>Option</th>
<th>Works Included</th>
<th>Cost</th>
<th>Structural Implications</th>
<th>Backlog Maintenance Costs</th>
<th>Risks</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>Minimal Maintenance Works</td>
<td>£400,000 per annum (diverted from block allocations)</td>
<td>Lane Closure in 10 years</td>
<td>£2,600,000</td>
<td>Increased</td>
<td>SJBC lane closures in 10 years</td>
</tr>
<tr>
<td>Option 2</td>
<td>Some Maintenance Works</td>
<td>£1,000,000 per annum (diverted from block allocations)</td>
<td>Lane Closure in years (to areas of lesser importance)</td>
<td>£780,000</td>
<td>Increased</td>
<td>SJBC lane closures. Road closures throughout Halton</td>
</tr>
<tr>
<td>Option 3</td>
<td>All Maintenance works. No Risks</td>
<td>£1,250,000 per annum (£850k from new funding)</td>
<td>Only those associated with risk items (refer section 4 and appendix B)</td>
<td>Only if risk items occur</td>
<td>Increased if risk occurs</td>
<td>Risk impact worsened if repair not funded.</td>
</tr>
<tr>
<td>Option 4</td>
<td>All Maintenance Works, some risk</td>
<td>£1,500,000 per annum (£1.1million from new funding)</td>
<td>Only if several risks occur</td>
<td>Zero</td>
<td>No increase</td>
<td>None</td>
</tr>
</tbody>
</table>
5.2.1 **Option 1**

From the discussion in section 4 it can be seen that option 1 has several key drawbacks.

The funding used for the SJBC is not considered sufficient to maintain the steady state maintenance of the SJBC leading to likely road or lane closures within 10 years.

No allowance can be made for risk items occurring in this option and as such any risk that is realised has the potential to close lanes or entire sections of the SJBC indefinitely.

Section 4.1.6 discusses the far reaching implications of closures of the SJBC which included extensive disruption to the highway network, invalidation of the Mersey Gateway Sustainable Transport Strategy and cutting of off main utilities supplies.

Therefore, overall this option is not considered an effective proposal for the future maintenance of the SJBC.

5.2.2 **Option 2**

Similarly to Option 1, Option 2 has several key drawbacks

Funding will be diverted from both the bridges and highways block allocation. Although this enables more of the SJBC maintenance works to be undertaken, the full list of works still cannot be covered at this funding level and lane closures are still expected within 10 years.

The funding to be diverted from other areas in the Halton region will leave the region’s other bridges, retaining walls and culverts with little maintenance funding. This residual funding is not considered sufficient to maintain the steady state maintenance of these structures leading to widespread deterioration and likely road closures.

The future maintenance liability for HBC will increase greatly for both the SJBC and the other structures and highways in the region which would be left unattended due to the diversion of funds.

No allowance can be made for risk items occurring in this option and as such any risk that is realised has the potential to close lanes or entire sections of the SJBC indefinitely.
Silver Jubilee Bridge Complex

The degeneration of structures in the Halton Region and the implications of such, as discussed in section 4.2.3, are not considered an appropriate price to pay for partial coverage of the required maintenance works to the SJBC. Therefore this option is not considered an effective proposal for the future maintenance of the SJBC.

5.2.3 Option 3

Option 3 allows the full list of maintenance items to be covered and as such should allow the SJBC to be maintained at a steady state without consequence to the wider Halton region.

However, the lack of consideration of risk leaves HBC without provision should an item from the risk schedule be realised. In such a situation HBC would need to divert funding from either the SJBC maintained fund or the Halton highways and bridges block allocations. In either of these cases the realisation of the risk would lead to a future increased cost of maintenance works to either the SJBC or other structures in the region due to the lack of maintenance works able to be carried out due to the diverted funding.

This reduced maintenance work would also increase the risk profile of the SJBC and other bridges and highways in the region.

Making no allowance for risks is therefore not considered to be an appropriate option for the future maintenance regime for SJBC.

5.2.4 Option 4

Option 4 ensures that all maintenance works are carried out and appropriate allowance is made for a risk occurring. The only significant implications for either the SJBC or the Halton region result from realisation of a number of risks beyond that considered probable by this analysis.

This option is therefore considered to be an appropriate strategy for the future maintenance of the SJBC.

5.2.5 Recommendation

Option 4 is recommended on this basis that a steady state of maintenance can be maintained without negative impact on the wider Halton region. In addition the risk of extra works being required, beyond those noted in the maintenance schedule is mitigated by making reasonable provision.
6. Deliverability of Preferred Option

HBC have overseen a significant amount of maintenance and repair works to the SJBC since they first became reasonable for the complex in 1998. As such they are experienced and well positioned to deliver the future maintenance works to the SJBC.

6.1.1 Programme

It is proposed that maintenance works would be undertaken on a yearly programme over the period 2016/17 – 2018/19 as detailed in the schedule contained in appendix B.

6.1.2 Management

The works will be managed directly by HBC’s current team lead by Mike Bennett (Highway Bridge Maintenance Manager).

There are no specific partners with this particular scheme although there will be a degree of co-ordination required with the Mersey Gateway Project Company and Crossings Board to avoid conflict of interest and negative impact on toll revenues.

6.1.3 Procurement

Works will be procured via an OJEU compliant process.

6.1.4 Works

Some of the routine works scheduled will require lane closures or traffic management. Where possible these will be restricted to nightshifts and weekends to avoid disruption to the highway network in the region. A full method statement will be produced in advance of the works which will take cognisance of the Mersey Gateway programme of works.
Appendices

Appendix A. SJBC Drawings ................................................................. 40
Appendix B. SJBC Maintenance Schedules ............................................... 41
Appendix A. SJBC Drawings
Appendix B.  SJBC Maintenance Schedules
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>00: SJB Complex General</strong></td>
<td>None.</td>
<td>None.</td>
<td>3,500 (Annually)</td>
<td>Remote monitoring of the CP Systems for the next 20 years and onwards.</td>
</tr>
<tr>
<td>Technical Support for Cathodic Protection Systems in the SJB Complex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10: Silver Jubilee Bridge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main span</td>
<td>Footway Stringer top hat refurbishment.</td>
<td>Lane closures on A533.</td>
<td>80,000</td>
<td>Works discussed during Task Order S but not undertaken.</td>
</tr>
<tr>
<td>Arch access safety equipment</td>
<td>Annual testing</td>
<td>None.</td>
<td>5,000 (Annually)</td>
<td></td>
</tr>
<tr>
<td>Hanger Cables</td>
<td>Special Inspection of lower cable</td>
<td>Traffic management A533.</td>
<td>20,000</td>
<td>Undertaken in batches of 12 per year on a 4 year cycle.</td>
</tr>
<tr>
<td>Runcorn Spandrel Steelwork</td>
<td>Principal Inspection</td>
<td>None.</td>
<td>40,000</td>
<td>Last PBI 2008.</td>
</tr>
<tr>
<td>Underdeck Steelwork Suspended Span</td>
<td>Principal Inspection (1/3 of suspended span each year)</td>
<td>None.</td>
<td>40,000</td>
<td>Last underdeck PBI undertaken 2010-2013. Undertake subsequent PBI 2016-2019.</td>
</tr>
<tr>
<td>Runcorn Side Span – above deck steelwork</td>
<td>Principal Inspection</td>
<td>Traffic management A533.</td>
<td>30,000</td>
<td>Last PBI 2010.</td>
</tr>
<tr>
<td>Widnes Side Span – above deck steelwork</td>
<td>Principal Inspection</td>
<td>Traffic management A533.</td>
<td>30,000</td>
<td>Last PBI 2010.</td>
</tr>
</tbody>
</table>

Costs are based on rates for 2014

Date: March 2014
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>13 : High Street Bridge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Structure (including subway and its access steps)</td>
<td>Concrete repairs to south abutment.</td>
<td>Footway closure through subway.</td>
<td>10,700</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Retreading of steps</td>
<td></td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refurbishment of parapet</td>
<td>Traffic Management on A533</td>
<td>21,500</td>
<td></td>
</tr>
<tr>
<td><strong>20 : Waterloo Bridge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abutments, Wing ball, piers, arch barrels and spandrels.</td>
<td>Repair cracked stones and replace otherwise damaged stones.</td>
<td>Canal restrictions below.</td>
<td>16,070</td>
<td></td>
</tr>
<tr>
<td>Arch barrels</td>
<td>Install weep pipes in north arch barrel.</td>
<td>Canal restrictions below.</td>
<td>16,070</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>Principal Inspection</td>
<td>Canal restrictions below.</td>
<td>20,000</td>
<td>Previous PBI 2002.</td>
</tr>
<tr>
<td><strong>12 : Runcorn Approach Viaduct West</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parapets</td>
<td>Replace sub-standard parapets</td>
<td>Traffic Management on A533</td>
<td>128,600</td>
<td>All works subject to bridge not being demolished as part of Mersey Gateway. Approx 200m to west and 25m to east at interface between the two abutting Runcorn Approach Viaduct structures. Parapet risk analysis may be required first.</td>
</tr>
<tr>
<td>Structure &amp; Location</td>
<td>Remedial Work</td>
<td>Lane/Rail Closures</td>
<td>Cost (£)</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>12 : Widnes Approach Viaduct</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deck</td>
<td>Replace expansion joint N6</td>
<td>Traffic Management A533</td>
<td>52,000</td>
<td>Replacement was due to be undertaken during Task Order P but was postponed due to the poor condition of the deck and the limited road closure time available in the programme to undertake the necessary concrete repairs.</td>
</tr>
<tr>
<td>Concrete repairs to the deck at N6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resurfacing at location of remedial works above.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parapets</td>
<td>East parapet replacement and cantilever strengthening</td>
<td>Traffic Management A533</td>
<td>338,500</td>
<td>Could be undertaken in sections similar to High Street and Weston Village bridges.</td>
</tr>
<tr>
<td>West parapet testing</td>
<td>Traffic Management A533</td>
<td>10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15 : Greenway Road Bridge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abutments and wing walls.</td>
<td>Repair cracks. Replace joint sealant. Test suspect concrete.</td>
<td>None.</td>
<td>32,150</td>
<td></td>
</tr>
<tr>
<td>Parapets.</td>
<td>Replace mortar beneath parapet posts.</td>
<td>None.</td>
<td>2,150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repaint.</td>
<td></td>
<td>43,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace mesh to North parapet.</td>
<td></td>
<td>4,300</td>
<td></td>
</tr>
<tr>
<td>Deck</td>
<td>Bird netting</td>
<td></td>
<td>10,000</td>
<td></td>
</tr>
</tbody>
</table>

Costs are based on rates for 2014

Date: March 2014
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 : Station Road Footbridge</td>
<td>Post – tensioned concrete beams.</td>
<td>Undertake special inspection/investigation of the post tensioned units (ref BA 50/93).</td>
<td>Lane closures on Daresbury Expressway.</td>
<td>26,800</td>
</tr>
<tr>
<td>Deck</td>
<td>Repair spalling to string courses.</td>
<td>Lane closures on Daresbury Expressway.</td>
<td>3,250</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL YEAR COST</strong></td>
<td></td>
<td></td>
<td><strong>1,208,590</strong></td>
<td></td>
</tr>
<tr>
<td>Structure &amp; Location</td>
<td>Remedial Work</td>
<td>Lane/Rail Closures</td>
<td>Cost (£)</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>--------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>00: SJB Complex General</td>
<td>Technical Support for Cathodic Protection Systems in the SJB Complex</td>
<td>None.</td>
<td>3,500 (Annually)</td>
<td>Remote monitoring of the CP Systems for the next 20 years and onwards.</td>
</tr>
<tr>
<td>10: Silver Jubilee Bridge</td>
<td>Arch access safety equipment</td>
<td>Annual testing</td>
<td>5,000 (Annually)</td>
<td>None.</td>
</tr>
<tr>
<td></td>
<td>Hanger Cables</td>
<td>Special Inspection of lower cable</td>
<td>Traffic management A533.</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>Underdeck Steelwork Suspended Span</td>
<td>Principal Inspection (1/3 of suspended span each year)</td>
<td>None.</td>
<td>40,000</td>
</tr>
<tr>
<td></td>
<td>Underdeck Steelwork Runcorn Trestle-Y5 including Spandrel Steelwork.</td>
<td>Minor maintenance painting</td>
<td>None.</td>
<td>250,000</td>
</tr>
<tr>
<td>11 : Runcorn Approach Viaduct</td>
<td>All</td>
<td>Principal Inspection</td>
<td>Minor traffic management where necessary.</td>
<td>30,000</td>
</tr>
<tr>
<td>Structure &amp; Location</td>
<td>Remedial Work</td>
<td>Lane/Rail Closures</td>
<td>Cost (£)</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>--------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>14 : Doctors Bridge</td>
<td>Deck</td>
<td>Resurfacing, waterproofing and deck repairs.</td>
<td>Lane closures on Devonshire Place</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td>Minor maintenance painting</td>
<td>None.</td>
<td></td>
<td>40,000</td>
</tr>
<tr>
<td></td>
<td>Principal Inspection</td>
<td>Access over canal</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>20 : Waterloo Bridge</td>
<td>Underdeck metalwork</td>
<td>Minor maintenance painting</td>
<td>Canal management.</td>
<td>50,000</td>
</tr>
<tr>
<td>TOTAL YEAR COST</td>
<td></td>
<td></td>
<td></td>
<td>1,261,000</td>
</tr>
<tr>
<td>Structure &amp; Location</td>
<td>Remedial Work</td>
<td>Lane/Rail Closures</td>
<td>Cost (£)</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------</td>
<td>--------------------</td>
<td>--------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>00: SJB Complex General</td>
<td>Technical Support for Cathodic Protection Systems in the SJB Complex</td>
<td>None.</td>
<td>3,500 (Annually)</td>
<td>Remote monitoring of the CP Systems for the next 20 years and onwards.</td>
</tr>
<tr>
<td>10: Silver Jubilee Bridge</td>
<td>Arch access safety equipment Annual testing</td>
<td>None.</td>
<td>5,000 (Annually)</td>
<td>Undertaken in batches of 12 per year on a 4 year cycle.</td>
</tr>
<tr>
<td></td>
<td>Hanger Cables Special Inspection of lower cable</td>
<td>Traffic management A533.</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Underdeck Steelwork Suspended Span Principal Inspection (1/3 of suspended span each year)</td>
<td>None.</td>
<td>40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Runcorn Spandrel Steelwork Principal Inspection</td>
<td>None.</td>
<td>40,000</td>
<td>Previous PBI 2010 – but propose 8 yearly PBI as lower risk steelwork away from carriageway ‘splash’ zone.</td>
</tr>
<tr>
<td></td>
<td>Arch Principal Inspection</td>
<td>None.</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>19: Station Road Bridge</td>
<td>Deck Resurfacing, waterproofing, expansion joints and deck repairs.</td>
<td>Lane closures on A533 and Station Road.</td>
<td>450,000</td>
<td>Surface course alone replaced in 2007 and 2008 for southbound and northbound carriageways respectively. Assuming full resurfacing due 2018.</td>
</tr>
</tbody>
</table>

Costs are based on rates for 2014

Date: March 2014
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 : Picow Farm Road Bridge</td>
<td>Deck: Resurfacing, waterproofing, expansion joints and deck repairs.</td>
<td>Lane closures on A533.</td>
<td>240,000</td>
<td>Surface course alone replaced in 2007 and 2008 for southbound and northbound carriageways respectively. Assuming full resurfacing due 2018.</td>
</tr>
<tr>
<td>16 : Playground Bridge</td>
<td>Deck: Resurfacing, waterproofing, and deck repairs.</td>
<td>Lane closures on A533.</td>
<td>210,000</td>
<td>Surface course alone replaced in 2007 and 2008 for southbound and northbound carriageways respectively. Assuming full resurfacing due 2018.</td>
</tr>
<tr>
<td>3 : Desoto Road Railway Bridge</td>
<td>All: Principal Inspection</td>
<td>Traffic management A533 and railway possession.</td>
<td>25,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td>3 : Desoto Sidings Bridge</td>
<td>All: Principal Inspection</td>
<td>Traffic management A533 and Desoto Road East.</td>
<td>20,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td>6 : Hutchinsons Sidings Bridge</td>
<td>All: Principal Inspection</td>
<td>Traffic management A557.</td>
<td>20,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td>9 : Widnes Approach Viaduct</td>
<td>All: Principal Inspection</td>
<td>Minor traffic management where necessary.</td>
<td>30,000</td>
<td>Previous PBI 2013.</td>
</tr>
</tbody>
</table>

Costs are based on rates for 2014       

Date: March 2014
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 : High Street Bridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>25,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management and access over canal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 : Station Road Bridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>30,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management Runcorn Expressway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 : Picow Farm Bridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>15,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 : Playground Bridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>15,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 : Greenway Road Bridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>20,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 : Station Road Footbridge</td>
<td>All</td>
<td>Principal Inspection</td>
<td>10,000</td>
<td>Previous PBI 2013.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic management Runcorn Expressway</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL YEAR COST</strong></td>
<td></td>
<td></td>
<td>1,268,500</td>
<td></td>
</tr>
</tbody>
</table>
### 2016/17-2018/19 SJB Complex Maintenance Works

#### Risk Elements : Page 1

<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>% Likelihood Occurring Once in 3 Years</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10: Silver Jubilee Bridge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Span</td>
<td>Footway Girder structural repairs.</td>
<td>Lane closures above on A533.</td>
<td>50,000 (per location)</td>
<td>50%</td>
<td>Previously identified locations undertaken during previous Task Orders A and S. Any new additional locations uncovered during routine inspections.</td>
</tr>
<tr>
<td>Main Span, Side Spans and Approach spans</td>
<td>Unforeseen repair of Cathodic Protection (CP) components.</td>
<td>None but it would require access to the deck soffit such as roped access, scaffold or MEWP depending on location.</td>
<td>10,000</td>
<td>25%</td>
<td>This item covers the unforeseen damage to the CP system; such as a loose redundant cable of the variety found on SJB breaking loose and blowing in the wind dislodging a CP cassette.</td>
</tr>
<tr>
<td><strong>SJB Complex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SJB and Complex structures</td>
<td>General concrete repairs</td>
<td>Lane closures above on A533 – depends on location.</td>
<td>75,000 (per annum)</td>
<td>40%</td>
<td>Nominal annual maintenance cost that may include general concrete repairs to the SJB deck, other SJB Complex structures including underbridges and retaining wall.</td>
</tr>
<tr>
<td>SJB and Complex structures</td>
<td>General steelwork repairs.</td>
<td>Lane closures above on A533 – depends on location.</td>
<td>75,000 (per annum)</td>
<td>40%</td>
<td>Nominal annual maintenance cost that may include general steelwork repairs to the SJB deck, other SJB Complex structures including underbridges.</td>
</tr>
<tr>
<td>SJB and Complex underbridges</td>
<td>General unforeseen expansion joint replacement.</td>
<td>Lane closures A533</td>
<td>100,000</td>
<td>25%</td>
<td></td>
</tr>
</tbody>
</table>

**Costs are based on rates for 2014**


Date : March 2014
<table>
<thead>
<tr>
<th>Structure &amp; Location</th>
<th>Remedial Work</th>
<th>Lane/Rail Closures</th>
<th>Cost (£)</th>
<th>% Likelihood Occurring Once in 3 Years</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 : Runcorn Approach Viaduct</td>
<td>Bearings</td>
<td>Road closure above of A533</td>
<td>100,000</td>
<td>10%</td>
<td>Elastomeric bearings are supposed to last 50 years. Runcorn Approach Viaduct has elastomeric bearings from the original SJB construction in 1961. Reported in good condition but risk due to age that they may need replacing.</td>
</tr>
<tr>
<td>12 : Widnes Approach Viaduct</td>
<td>Bearings</td>
<td>Road closure above of A533</td>
<td>100,000</td>
<td>10%</td>
<td>Elastomeric bearings are supposed to last 50 years. Widnes Approach Viaduct has elastomeric bearings from the SJB widening construction in 1977. Reported in good condition but risk due to age that they may need replacing.</td>
</tr>
</tbody>
</table>
www.mottmac.com
Appendix B. Consultation Letter Responses

Consultation letter responses included;

a. D Twigg MP
b. G Evans MP
c. Cllr J Stockton; Member of the Merseytravel Committee
d. Cllr T McInerney; Portfolio Holder for Transport & Highways Halton
e. Cllr J Bradshaw; Leader of the Conservative Group of Councillors, Daresbury
f. P Cain; Halton Chamber of Commerce and Enterprise
g. J Leake; Business Development Manager, Sci-Tech, Daresbury
h. S Madigan; Arriva, Runcorn
i. M L Singh; BID Manager, Astmoor Business Improvement District (partnership).
13 October 2015

Our Ref: DT/RL/MISC01001/01151052

Mick Noone, Operational Director, Policy, Planning & Transport
Mick Noone
Halton Borough Council
Municipal Building
Kingsway, Widnes
Cheshire WA8 7QF

By e-mail

Liverpool City Region - Major Schemes: Silver Jubilee Bridge Major Maintenance.

As the Member of Parliament for Halton, I would like to offer my full support to the Silver Jubilee Bridge Major Maintenance grant application to the Liverpool City Region Major scheme fund.

As you are aware, the Silver Jubilee Bridge (SJB) plays an integral part in the wider Mersey Gateway Bridge complex to provide a local crossing to Halton residents, but will also provide network resilience across the river Mersey when required.

I appreciate that the availability of this strategic link in the regional road network is dependent on the condition and serviceability of all structures forming the Silver Jubilee Bridge Complex (SJBC) and that the programme of works to maintain the Silver Jubilee Bridge will ensure a steady state maintenance enabling the SJB to continue its valuable role as a sustainable transport connection and services host between the towns of Runcorn and Widnes and onto the wider Liverpool City Region.

The Mersey Gateway (MG) project is entirely dependent upon the availability of the Silver Jubilee Bridge Complex and hence this major maintenance scheme. The SJB also acts as valuable partner to the new Mersey Gateway crossing, and will continue to support the delivery of economic growth by improving journey times and reducing congestion for the travelling public accessing employment and training opportunities within Halton and the wider Liverpool City Region.
Mick Noone,
Operational Director, Planning, Policy and Transportation
Halton Borough Council,
Municipal Building,
Kingsway,
Widnes,
WA8 7QF

Dear Mick

Liverpool City Region- Major Schemes: Silver Jubilee Bridge Major Maintenance.

The Silver Jubilee Bridge provides a vital local crossing to thousands of my constituents each day. The programme of works to maintain the Silver Jubilee Bridge will ensure a steady state of maintenance enabling the Bridge to continue its valuable role as a sustainable transport connection and services host between the towns of Runcorn and Widnes and onto the wider Liverpool City Region.

The Silver Jubilee Bridge acts as vital partner to the new Mersey Gateway crossing, and will continue to support economic growth by improving journey times and reducing congestion for the my constituents accessing employment and training opportunities in and around the area.

I would like to offer my comprehensive support to the Silver Jubilee Bridge Major Maintenance grant application to the Liverpool City Region Major scheme fund.

Yours sincerely,

Graham Evans MP
Member of Parliament for Weaver Vale
Dear Mick,

Liverpool City Region - Major Schemes: Silver Jubilee Bridge Major Maintenance.

As portfolio holder for Highways and Transportation I would like to offer my full support to the Silver Jubilee Bridge Major Maintenance grant application to the Liverpool City Region Major scheme fund.

The Silver Jubilee Bridge (SJB) plays an integral part in the wider Mersey Gateway Bridge complex as it will provide a local crossing to Halton residents, but will also provide network resilience across the river Mersey when required. The programme of works to maintain the Silver Jubilee Bridge will ensure a steady state maintenance enabling the SJB to continue its valuable role as a sustainable transport connection and services host between the towns of Runcorn and Widnes and onto the wider Liverpool City Region.

The Silver Jubilee Bridge also acts as valuable partner to the new Mersey Gateway crossing, and will continue to support the delivery of economic growth by improving journey times and reducing congestion for the travelling public accessing employment and training opportunities within Halton and the wider Liverpool City Region.

Yours sincerely,

Cllr Tom Mcinerney

Portfolio Holder for Transport & Highways
Hi Ian

I would like to write in support of our application for this as leader of the Conservative Group of Councillors (Marj & I!). A few of the major points you are looking to be included and pertinent would be useful for me and to whom it should be sent.

Kind regards

John

Sent from my iPad
Mick Noone,
Operational Director, Planning, Policy and Transportation
Halton Borough Council,
Municipal Building,
Kingsway,
Widnes,
WA8 7QF

13th October, 2015

Dear Mick,

Liverpool City Region- Major Schemes: Silver Jubilee Bridge Major Maintenance.

As Chief Executive of Halton Chamber of Commerce I wish to offer the Chamber's support to Halton Borough Council in their grant application to the Liverpool City Region Major scheme fund for a programme of works to maintain the Silver Jubilee Bridge which crosses the river Mersey and provides a vital connection between Runcorn and Widnes to the residents of Halton.

The major maintenance of the Silver Jubilee Bridge will provide the residents of Halton and the wider Liverpool City Region the only opportunity to cross the river Mersey on foot or bicycle within the Liverpool City Region. The Silver Jubilee Bridge also acts as valuable partner to the new Mersey Gateway crossing, and will continue to support the delivery of economic growth by improving journey times and reducing congestion for the travelling public accessing employment and training opportunities within Halton and the wider Liverpool City Region.

Yours sincerely,

Paula Cain,
Chief Executive
Mick Noone,
Operational Director, Planning, Policy and Transportation
Halton Borough Council,
Municipal Building,
Kingsway,
Widnes,
WA8 7QF

August 28th 2015

Dear Mick,

Liverpool City Region- Major Schemes: Silver Jubilee Bridge Major Maintenance.

As Sci-Tech Daresbury I would like to offer support to Halton Borough Council in their grant application to the Liverpool City Region Major scheme fund for a programme of works to maintain the Silver Jubilee Bridge which crosses the river Mersey and provides a vital connection between Runcorn and Widnes to the residents of Halton.

The major maintenance of the Silver Jubilee Bridge will provide the residents of Halton and the wider Liverpool City Region the only opportunity to cross the river Mersey on foot or bicycle within the Liverpool City Region. The Silver Jubilee Bridge also acts as valuable partner to the new Mersey Gateway crossing, and will continue to support the delivery of economic growth by improving journey times and reducing congestion for the travelling public accessing employment and training opportunities within Halton and the wider Liverpool City Region.

Yours sincerely,

[Signature]

John Leake
Business Development Manager
Hi Becky,

Having read the letter from Mick, Arriva Runcorn would obviously have an interest in the funding for the maintenance of the SJB. As a major employer in the area and a business that provides public transport, it is vital to our business to have an alternative form of River crossing if anything were to happen, i.e. a major incident on the Mersey Gateway that involved a closure. Currently and for previous years, we have experienced significant disruption and loss of business when there has been an incident on the SJB, never mind a full closure which in relative terms is frequent. To have an alternative would minimise the impact of such a major incident and disruption to our passengers so would support a bid for the funding.

Regards
Sue
Dear Mr Noone

Liverpool City Region- Major Schemes: Silver Jubilee Bridge Major Maintenance

The Astmoor Business Improvement District (BID) is committed to improving employment opportunities for the North West as a whole and in Halton in particular.

As such we welcome the opportunity to work more closely with local partners to deliver improvements accessible through Liverpool City Region Major scheme fund.

The Astmoor BID is proud to support the Halton bid as we believe that, if successful, the bid will deliver significant benefits to the Borough and will provide a unique opportunity to design and build targeted transport packages that address the particular transport problems in this area.

We particularly welcome the focus on access to employment and reducing the carbon emissions associated with the transport network.

The Astmoor Business Improvement District (BID) is a partnership between businesses and property owners on Astmoor Industrial Estate and a range of partner organisations. Since its inception in 2008 this programme has addressed a range of projects focusing on four key themes:

- Increasing business security and preventing crime
- Image enhancement measures across the estate and
- Providing a range of support functions that benefit all businesses
- Providing training opportunities to upskill employees

The Liverpool City Region Major scheme fund is potentially a key element in delivering these projects and supporting the 130+ businesses on the estate by:
Increasing employment opportunities for long term unemployed by removing some barriers to getting to work e.g. improved bus service, footpaths, cycle ways

- Helping to retain experienced staff avoiding recruitment, advertising and initial training costs for employers
- Increasing the options for employees getting to work
- Encouraging greener methods of transport reducing greenhouse emissions
- Reduce road and pedestrian accidents and subsequently absence from work

I would like to offer the support of Astmoor Business Improvement District to Halton Borough Council in their grant application to the Liverpool City Region Major scheme fund for a programme of works to maintain the Silver Jubilee Bridge which crosses the river Mersey and provides a vital connection between Runcorn and Widnes to the residents of Halton.

The major maintenance of the Silver Jubilee Bridge will provide the residents of Halton and the wider Liverpool City Region the only opportunity to cross the river Mersey on foot or bicycle within the Liverpool City Region.

The Silver Jubilee Bridge also acts as valuable partner to the new Mersey Gateway crossing, and will continue to support the delivery of economic growth by improving journey times and reducing congestion for the travelling public accessing employment and training opportunities within Halton and the wider Liverpool City Region.

A successful bid for Halton would see many of these aspirations achieved and would create a work environment on Astmoor that is not only easily accessible for employees, but is also safe, healthy and an attractive area for investment.

Yours sincerely,

Laki Singh
BID Manager - Astmoor