

Report of Director of City Development

Report to Executive Board

Date: 15th February 2013

Subject: Bridgewater Place Wind Mitigation Measures

Are specific electoral Wards affected? If relevant, name(s) of Ward(s): City and Hunslet	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Are there implications for equality and diversity and cohesion and integration?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Is the decision eligible for Call-In?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Does the report contain confidential or exempt information? If relevant, Access to Information Procedure Rule number: 10.4(5) Appendix number: 4	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Summary of main issues

1. Since the construction of the Bridgewater Place development in late 2007, problems have been experienced in high winds around Water Lane / Victoria Road junction adjacent to the building. Complaints have been received from pedestrians being blown around and in March 2011 a lorry was blown over causing the death of a pedestrian (Dr Slaney) and serious injury of another. No wind related incidents are known to have been reported to the Council prior to the construction of the Bridgewater Place Building and baseline wind testing has proved conclusively that this area was safe for all uses prior to the building being erected.
2. Ongoing independent wind testing by CPP, Inc (Expert Wind Engineers based in Colorado, USA), commissioned jointly by Bridgewater Place Ltd, CPPI Bridgewater Place and the Council, has sought to find modifications to the Bridgewater Place building which could reduce the issues faced by pedestrians at ground level around the building and in the public highway. The testing has found that current conditions, as have been experienced on site, do not pass commonly accepted pedestrian comfort or safety criteria. A large number of potential mitigation options have been investigated and the latest draft wind test report presents the results of those selected as being the most effective.
3. In addition to this, the Council commissioned Buro Happold, wind engineering experts, to advise on the appropriateness and validity of the wind testing being undertaken by CPP Inc. The latest draft wind tunnel testing report concludes that each of the schemes tested was found to offer significant improvements compared

with existing conditions. However, the final conditions are still less than ideal and additional measures are required to mitigate the wind problems in the highway.

4. Further work was undertaken by Buro Happold using an alternative form of modelling, computational fluid dynamic (CFD) modelling, and this has identified a potential solution to remove the problems within the highway due to high winds. This potential solution now needs to be subjected to further wind tunnel testing to corroborate the findings to enable the Council to have confidence in pursuing this course of action.

In addition to the wind testing and as an interim response to the conditions on the ground the Council has responded with a series of measures. These include:

- the erection of warning “wind sock” signage to warn motorists to expect cross winds
- erection of pedestrian guardrailling around the affected area to prevent pedestrians from being blown into the road and give them something to hold onto in high wind conditions
- use of VMS sign to warn of strong winds (when applicable)
- use of temporary diversion for high-sided vehicles away from the junction of Neville Street / Victoria Road / Water Lane in high winds.
- further pedestrian signage to warn of gusty winds is currently being manufactured.

Recommendations

Executive Board is requested to:

- i) Note the contents of this report in terms of the background information, interim mitigation solutions on the ground and work in progress towards a comprehensive solution.
- ii) Endorse the continued development of work towards an agreed and deliverable solution to the wind issue.
- iii) Support the principle of the proposed baffles above the highway on Water Lane and seek Authority to Spend for continued wind testing, legal support, highway officer time and engineering design work of £245k to enable a detailed design to be provided for a baffle solution. A further report will be brought back to Executive Board to cover the details of the design of the baffles and the cost of implementing them.

1 Purpose of this report

- 1.1 To update Executive Board about the current position regarding discussions with the owners of Bridgewater Place and advise on the results from the latest round of wind tunnel testing on the preferred building modification measures and their implications for the development of a mitigation scheme.
- 1.2 To inform Executive Board about interim measures which are being taken and potential future mitigation proposals within the highway to improve wind issues and to gain support for the current proposals and the potential financial implications for pursuing this option.
- 1.3 To inform Members about the ongoing Inquest into the death of Dr Slaney.

2 Background information

- 2.1 Planning permission for Bridgewater Place was granted in November 2001. A wind assessment had been required by condition prior to the building being constructed and this was carried out by BRE Ltd but did not identify any unacceptable impacts or required design modifications. The condition was therefore discharged and no design modifications were made to the building.
- 2.2 The building was completed in late 2007 and in January and February 2008 the Council started to receive complaints from local residents and office workers about the severity of the wind conditions being experienced around the building. As no such complaints had been received prior to the construction of Bridgewater Place Council Officers approached the developer's of the building, Landmark Development Ltd, in March 2008 and have been in ongoing dialogue since to try and ameliorate the problems which the building has caused.
- 2.3 As Highway Authority, and without prejudice to the outcome of detailed investigations, Leeds City Council has erected significant lengths of pedestrian guardrail in the area to prevent pedestrians from being blown into the road on Water Lane and Victoria Road. This was initially put in as temporary concrete barrier in 2008 but replaced with permanent guardrail in January 2010, with additional lengths added in July 2011. In addition, wind sock signs were erected to warn motorists of the potential for side winds and a system for diverting high-sided vehicles on days of high winds has been introduced using temporary signs following the fatal accident involving a high sided vehicle being blown onto pedestrians in March 2011. The diversion has been deployed on four occasions to date.
- 2.4 An independent specialist wind consultant (CPPI) was appointed jointly by Landmark Developments Ltd / Leeds City Council and Bridgewater Place Design Build Company. Initial joint wind testing occurred in March 2010 which highlighted the area of influence of the building on the wind conditions and confirmed that the main area of concern was the forecourt and the highway of Water Lane. Further tests were carried out in June 2010 with a canopy placed on the model of the building. The canopy designs were developed by the wind tunnel specialists based on their experience of wind engineering for tall buildings. There were twelve scenarios tested, the canopy varying in size and location, also including baffles / screens. Plans of the options tested are attached at **Appendix 1**.

- 2.5 Leeds City Council does not employ wind engineering experts, therefore consultants have been employed from Buro Happold to advise on the appropriateness and validity of the wind testing being undertaken by CPP Inc. Buro Happold have attended all meetings with the Developer's and have advised the Council on the most appropriate solution to address concerns within the highway.
- 2.6 A third round of testing took place in November 2011 which focused on four of the best performing canopies including the Council Officer's preferred option which was a 2-storey canopy extending across the building forecourt and frontage. Plans of these canopy options are attached at **Appendix 2**.
- 2.7 Although the canopy proposals did demonstrate improved conditions for the public in the immediate vicinity of Bridgewater Place, none of the options put forward materially improved conditions within the highway. As a result the Council commissioned Buro Happold to look more broadly at further options not previously considered. Buro Happold undertook specific computational fluid dynamic (CFD) modelling on a number of scenarios during this summer and identified a proposal which (subject to further testing) has the potential to offer significant wind mitigation within the highway. In brief, this comprises a canopy on the building in combination with three tall vertical screens on the north western corner of the Bridgewater Place building and various options for baffles across the highway on Water Lane. See images at **Appendix 3**.
- 2.8 In order for this to be validated the CFD modelling test results need to undergo wind tunnel testing to assess whether the proposal forms the basis for a design solution.
- 2.9 The Council has booked the wind tunnel testing for two of the baffle options to compare to the CFD modelling. This is scheduled to take place in early January 2013.
- 2.10 Assuming that the wind tunnel testing corroborates the CFD modelling the next stage is to commission Engineers to look into the practicalities of building the baffles within the adopted highway. No budget currently exists for this design work and for the funds needed to implement the scheme on the ground.
- 2.11 An anemometer (wind speed and direction measuring device) was erected in July 2012 and a daily wind forecast specific to the BWP area is being obtained from the Met Office which will be further improved as the dataset from the anemometer is built up. A system to warn vehicles of high winds by means of the existing VMS sign is currently employed at winds forecast to be over 35mph, to divert high-sided vehicles (including PSV's) away from the junction is deployed at winds forecast to be over 45mph and it is intended that consideration be given to closing the junction to all vehicles at winds forecast to be over 65mph.
- 2.12 Alongside this work the Inquest into the death of Dr Slaney in March 2011 was adjourned in February 2012 when the Coroner referred the case to the Crown Prosecution Service. It is understood that the CPS referred it back to the Coroner and a pre-inquest review hearing was heard on 7th December 2012. The dates for the resumed inquest have now been scheduled for 26 and 27 June 2013. As the Coroner is concerned to know the current position and progress made to ameliorate the wind problems, and has the power to write to the Council following the inquest

requesting further action be taken to prevent further deaths, the Council has volunteered that it will provide a further witness statement setting out details of all the work undertaken to date towards identifying and progressing a 'solution' to the wind problems. The Coroner has also advised that she will be appointing a wind expert to assist her prior to and / or at the resumed inquest.

3 Main Issues

- 3.1 The Council is continuing to work closely with the developer and owner of Bridgewater Place and has taken pro-active action (at its own cost) in seeking to identify the best mitigation measures which are both reasonable and achievable and will effectively address the wind issues within the highway in the vicinity of Bridgewater Place. Actions to date have been taken on a without prejudice basis given the importance of identifying and implementing permanent and effective mitigation measures. The current position is that the Council's wind experts have identified a potential 'solution', which comprises a number of 4m deep shaped baffles placed 6m above the highway across Water Lane. To verify this two options have been tested through the CPP, Inc wind tunnel including the proposed canopy plus two differing baffle options of four baffles of varying length and alignment over the highway and tall screens adjacent to the building corner. The results of the wind tunnel testing should be available in time for the February Executive Board meeting.
- 3.2 Subject to the wind tunnel testing supporting the earlier modelling, subsequent feasibility and buildability assessments will be required. Some initial work has been undertaken by Leeds City Council and Buro Happold looking at buildability issues / constraints but it is felt that it is imperative to know whether the CFD model results are verified in the wind tunnel before undertaking a detailed design of the baffles. An officer workshop to look further at the particular highway issues took place which has highlighted some constraints and issues to be overcome in relation to column support locations and detailed design considerations.
- 3.3 The building owners CPPi Bridgewater Place have in the meantime employed a team of architects and engineers to progress the detailed design of the building canopy. The owners have indicated that they wish to pursue the canopy scheme as soon as possible if necessary as a first phase with the option for highway baffles following on at a later stage. It is fair to say that their focus remains on resolving the issues experienced on the building's private forecourt and entrance area. However, their advisors work is exploring compatibility issues with the LCC Buro Happold concept as described above. Leeds City Council Officers have made it clear that a comprehensive solution is required to the wind issues, to ensure protection for all those affected by the problems caused by the building, and these will require planning permission in due course.
- 3.4 In a separate workstream, Leeds City Council Highway Officers have undertaken a risk assessment and option appraisal regarding proposals to manage the current risks at BWP for vehicles, especially high-sided vehicles (including public service vehicles PSV's), pedestrians and cyclists / motorcyclists. In addition to the current mitigation measures which the Council has put in place, which include wind sock signage, pedestrian guardrailing, use of VMS sign in high winds to warn motorists

and cyclists and a temporary HGV diversion in high winds, the preliminary outcome of this work is the proposal to implement permanent warning signage for cyclists and pedestrians, which is currently being progressed, and the proposal to permanently divert vehicles over 7.5t (not including PSV's) away from the Water Lane / Neville Street / Victoria Road junction – which is being progressed subject to further approvals.

- 3.5 It should be noted that Council Officers consulted with the Health and Safety Executive in 2009 after the wind concerns around Bridgewater Place had become apparent. The HSE responded that they did not have the expertise in the area and could not offer any advice on the appropriate course of action that Leeds City Council could take to implement any interim measures to mitigate the problem.
- 3.6 To move forward to the detailed design of the potential baffle solution and without prejudice to the ongoing legal position of the Council – which is covered in more detail in **Appendix 4** – exempt information, a budget of £245k is sought to enable the detailed design work to be carried out by the appropriate, engineer's, architects and wind consultants. The results of this design work and cost implications of implementing the eventual design will be brought back to Executive Board at a future date.
- 3.7 A photograph of a wind mitigation canopy which has been constructed at the "Cheesegrater", 122 Leadenhall Street, London, is attached at Appendix 5.

4 Corporate Considerations

4.1 Consultation and Engagement

- 4.1.1 Consultation on the content of this report is not appropriate. The report requests approval for funding to enable detailed design work to be conducted to address the issues encountered at Bridgewater Place. This is a technical issue which needs to be resolved for health and safety reasons. Also, the information contained in this report has been restricted due to the nature of the ongoing studies by the Environmental Impact Regulations.

4.2 Equality and Diversity / Cohesion and Integration

- 4.2.1 This report requests approval for funding to enable detailed design work to be conducted to address the issues encountered at Bridgewater Place which is a technical issue which needs to be resolved for health and safety reasons. As such, at this stage it is not appropriate to complete either an Equality, Diversity, Cohesion and Integration Screening or Impact Assessment. However, if approval is given by the Executive Board for Officers to further develop the proposals, a screening /full impact assessment will be undertaken at the planning and design stage and at further stages throughout the process as appropriate.

4.3 Council policies and City Priorities

- 4.3.1 These proposals are in accordance with Council Policies and City Priorities.

4.4 Resources and value for money

- 4.4.1 Works to date on this matter have been funded from the Council's central contingency provision. Going forward a budget is needed to complete the wind testing and support the detailed design and potentially the cost of implementing the appropriate wind mitigation proposals within the highway.
- 4.4.2 This report seeks Authority to Spend of £245k to carry out the detailed design. Injection of this funding is included in the Capital Programme Update 2013-16 elsewhere on the agenda.

4.5 Legal Implications, Access to Information and Call In

- 4.5.1 The information contained in Appendix 4 is exempt under Access to Information Rule 10.4 (5) as it contains information in respect of which a claim to legal professional privilege could be maintained in legal proceedings. It is considered that the public interest in maintaining the content of Appendix 4 as exempt outweighs the public interest in disclosing the information as there are potential legal implications with the proposals contained in this report.

4.6 Risk Management

- 4.6.1 A risk assessment and option appraisal about the existing risks of high wind events around Bridgewater Place has been undertaken and reviewed by the Risk Management Unit.

5 Conclusion

- 5.1 The wind issues in the vicinity of the Bridgewater Place building on Water Lane have been demonstrated to have been caused by the building. This is despite a wind assessment carried out by a reputable company BRE Ltd being submitted to discharge a planning condition, which suggested there wouldn't be a problem with the building design.
- 5.2 Since the building has been built in late 2007 a number of incidents have been reported, including the incident which led to the death of Dr Slaney when a lorry was blown over onto pedestrians in March 2011. Leeds City Council have responded to these incidents from the start and have installed local signage and guardrailing and more recently a temporary HGV diversion in high winds. In addition Leeds City Council have been in discussion with the developers of Bridgewater Place and part funded wind testing to try and find a comprehensive solution to the wind problem.
- 5.3 More recently Leeds City Council has appointed Buro Happold to review the work done to date by CPP Inc and see if any potential options to remove the wind problem from the highway have been missed. Buro Happold have identified a potential solution in the placement of baffles above the highway on Water Lane in combination with a canopy on the building forecourt and tall vertical screens adjacent to the canopy. It is important that a comprehensive solution to the wind problem is found.

- 5.4 This solution is being subjected to corroboratory wind tunnel testing, the results of which should be available early in the New Year. Subject to these results being positive then the next stage will be to appoint engineer's to undertake the feasibility and detailed design of the baffles over the highway.
- 5.5 This work needs to be progressed as a matter of urgency to ensure that a deliverable solution to the wind problem can be implemented without delay (subject to planning permission).

6 Recommendations

6.1 Executive Board is requested to:

- i) Note the contents of this report in terms of the background information, interim mitigation solutions on the ground and work in progress towards a comprehensive solution.
- ii) Endorse the continued development of work towards an agreed and deliverable solution to the wind issue.
- iii) Support the principle of the proposed baffles above the highway on Water Lane and seek Authority to Spend for continued wind testing, legal support, highway officer time and engineering design work of £245k to enable a detailed design to be provided for a baffle solution. A further report will be brought back to Executive Board to cover the details of the design of the baffles and the cost of implementing them.

7 Background documents¹

7.1 Ongoing wind testing, relating to the micro-climate around Bridgewater Place, has been provided in various external reports. The information contained in these reports has been restricted under the Environmental Impact Regulations 2004 due to the nature of the ongoing studies and is designated as exempt under Access to Information Rule 10.4(3).

8 Appendices

8.1 Appendix 1 – Initial canopy options wind tunnel tested

Appendix 2 – Preferred canopy options

Appendix 3 – Proposed vertical screens and illustrative image of baffle options

Appendix 4 – Legal Implications – Exempt Information

Appendix 5 – Photograph of recent wind mitigation canopy in London

¹ The background documents listed in this section are available to download from the Council's website, unless they contain confidential or exempt information. The list of background documents does not include published works.