1 BACKGROUND

1.1.1 Parsons Brinkerhoff (PB) has undertaken a Flood Risk Assessment (FRA) to predict the likely impacts upon flood risk that may result from rail infrastructure works related to the Ordsall Chord development. The Ordsall Chord is part of a wider programme of improvement works known as the Northern Hub.

1.1.2 To enable the Ordsall Chord development to proceed, it will be necessary to demolish Prince's Bridge. A replacement pedestrian and cycle bridge will be installed as part of the works necessitated for the construction of the Ordsall Chord. Prince's Bridge carries six known utilities across the River Irwell; including 24" water and 18" gas mains. There are thirteen utilities in the vicinity of the Water Street/Liverpool Road junction to Potato Wharf. There is also a large diameter brick sewer located near Middlewood (L&MR) viaduct.

1.1.3 The FRA prepared for the Ordsall Chord included a consideration of the proposed bridge to divert utilities from Prince's Bridge. The FRA was prepared by Ela Szostak MSc (Assistant Engineer), Joanna Goodwin MEng MCIWEM C.WEM (Senior Engineer) and Jon Price BSc (Hons) (Principal Engineer).

1.1.4 A synopsis of that FRA is provided in this Technical Note.

2 DESCRIPTION OF THE WORKS PROPOSED

2.1.1 There is a requirement to divert and protect these existing utilities due to the removal of Prince's Bridge, the abutment widening at the Water Street/ Liverpool Road junction and the tying in of the Ordsall Chord to the Middlewood (L&MR) Viaduct.

2.1.2 The "Utilities Bridge" will be diverted via a purpose-built bridge which will be constructed adjacent to Castlefield Bridge. The design of the Utilities Bridge has been informed by the design of Castlefield Bridge.

2.1.3 It will be a flat deck bridge design with utilities secured underneath, that will be used by cyclists and pedestrians as a temporary diversion after Prince's Bridge is demolished. Prince's Bridge will ultimately be replaced by a purpose-built pedestrian/cycle bridge in the same location. The current proposed design for the Utilities Bridge achieves a soffit clearance of 4.77 m over a square width of 33.45 m, which corresponds to the existing adjacent road bridge.

3 CONSULTATIONS UNDERTAKEN FOR THE FRA

3.1.1 Consultation was undertaken with Manchester City Council (MCC), Salford City Council (SCC), the Environment Agency (EA), and Peel Ports Authority.

3.1.2 The EA stated that their preferred option for the utilities river crossing would be beneath the channel bed, or within the existing bridge crossings. This is due to the preference for the number of structures over the river to be minimised in order to reduce potential impacts upon the risk of flooding. Diversion of the utilities under the river channel would not obstruct river flow or reduce the existing floodplain; hence it would have no impact on flooding. This option was explored but was not considered feasible by the Utility Operators and therefore could not be progressed. The key reason for this was that a diversion under the river channel would not facilitate maintenance access.

4 RESULTS OF THE FRA

4.1.1 The proposed Utilities Bridge crosses the area located in Flood Zone 2. Due to the insufficient level of detail shown on the Flood Maps, it is not possible to confirm whether the new bridge abutments are located in Flood Zone 3 adjacent to the banks of the Grey Irwell (as the River Irwell is known in this particular location). A precautionary approach was therefore taken in the FRA, and it was assumed that the abutments are located in Flood Zone 3.

4.1.2 The Lead Local Flood Authority (in this instance MCC and SCC) and the EA have confirmed the soffit level of the Utilities Bridge should be established at minimum level of 600 mm above the predicted 1 in 100 year flood level at this location, including climate change allowance[1] (providing a minimum required height of 25.63m AOD). Similarly, the minimum soffit level required by Peel Ports Authority is 4.77 m above normal water level of approximately 21.675m AOD (providing a minimum required height of 26.445m AOD).

4.1.3 The Utilities Diversion Bridge has been designed to mirror the design of Castlefield Bridge, to provide an aesthetic continuity in this area. As such, the majority of the structure is above the 26.445 m AOD required by the Peel Ports Authority and also above the 25.63 m AOD required by the LLFA and EA; excepting the beams which replicate the levels of the existing bridge. The soffit of these beams is 25.688 m AOD. This minimal difference will have no tangible impact on flood risk.

4.1.4 Further study and/or hydraulic modelling may be required to demonstrate that, if located in Flood Zone 3, the bridge abutments do not increase risk of flooding in the area or elsewhere. This will need to be confirmed with the EA.

4.2 Sequential Test

4.2.1 The National Planning Policy Framework (NPPF) recommends that the Local Planning Authority should apply the Sequential Test when considering applications for new development. This risk-based assessment tool aims to direct new development to those areas that are at the lowest risk of flooding (i.e. Flood Zone 1).

4.2.2 The majority of the proposed Utilities Bridge lies in Flood Zone 2, except for the abutments which are assumed (per the precautionary approach being taken) to be located within Flood Zone 3. Due to the constraints dictating the location of Utilities Bridge, it was not possible to locate the bridge in Flood Zone 1. The Exception Test will therefore be required (as per below).

4.3 Exception Test

4.3.1 The NPPF states that, if following application of the Sequential Test, it is not possible for the development to be located in areas with a lower probability of flooding; the Exception Test should be applied. The Utilities Bridge development is classified as ‘Essential Infrastructure’ in accordance with the ’Technical Guidance to the NPPF’.

4.3.2 The guidance states that this type of development (essential infrastructure), only requires the Exception Test to be applied for development proposals in Flood Zone 3. As there is a level of dubiety over whether the abutments to the Utilities Bridge are located in Flood Zone 3, the FRA took the precautionary approach and applied the Exception Test.

4.3.3 For the Exception test to be passed, it must be demonstrated that:

[1] A standard allowance of 20% has been applied to accommodate the potential effects of climate change.

- The development provides wider sustainability benefits to the community that outweigh the flood risk; and
- The development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.

4.3.4 Both elements of the test will have to be passed for development to be permitted.

4.3.5 The requirement for the Utilities Bridge originates from the Ordsall Chord development, which is part of the Northern Hub improvement programme. The Northern Hub interventions entail proposals for improvements to the rail network to enable growth in the economy and meet expected growing demand for rail travel over the next 60 years. In particular, the Manchester rail network presents the most significant bottleneck in achieving these aspirations for the North of England in terms of capacity and railway conflicts in Manchester itself.

4.3.6 The proposed Ordsall Chord development is therefore a key element in overcoming these restrictions in the current network and, whilst significant in its own right, will also provide the foundation for other elements of the Northern Hub programme to come forward.

4.3.7 The Utilities Bridge has been designed to accommodate a pedestrian and cycle path, which will provide a safe route for crossing the River Irwell, separated from motor vehicles. It is unclear whether the Utilities Bridge is located within Flood Zone 3 at all; however the FRA has assumed that it is on order to assess a worst-case scenario. Even when a worst-case scenario is applied, the area of the Utilities Bridge that is assumed to be located in Flood Zone 3 is relatively small.

4.3.8 Therefore, it is considered that the proposed Utilities Bridge provides minimal additional flood risk, whilst providing wider benefits to the community in relation to safer transport routes. The requirements of the Exception Test are therefore achieved and the test is passed.

5 CONCLUSIONS

5.1.1 It has been identified that the proposed abutments of the new Utilities Bridge may be partially located within Flood Zone 3; although this cannot be confirmed due to the insufficient level of detail shown on the Flood Maps. The FRA therefore applied the precautionary approach of assuming that proposed Utilities Bridge is located in Flood Zones 2 and 3.

5.1.2 In accordance with the Technical Guidance to NPPF, the proposed Scheme is classified as ‘Essential infrastructure’. As such, it does not require the Exception test to be carried out for development located in Flood Zone 1 and 2. The Exception Test was applied as the abutments of the Utilities Bridge are potentially located in Flood Zone 3.

5.1.3 The Utilities Bridge has been designed to mirror the design of Castlefield Bridge, to provide an aesthetic continuity in this area. As such, the majority of the structure is above the 26.445 m AOD required by the Peel Ports Authority and also above the 25.63 m AOD required by the LLFA and EA at this location; excepting the beams which replicate the levels of the existing bridge. The soffit of these beams is 25.688 m AOD. This minimal difference will have no tangible impact on flood risk. The bridge will be constructed as a single span structure with no permanent structures within the river channel, which will not obstruct river flow. The river channel will remain unaltered.

5.1.4 The FRA demonstrates that the proposed Utilities Bridge has been designed in accordance with LLFA and the EA guidance to assure that the bridge does not have an impact on existing river flow, flood risk or navigation. Further consultation will be undertaken with the EA to determine the need for further study and/or hydraulic modelling to confirm the location of the abatements with respect to the Flood Zone 3 and ensure no significant impact to flood risk.