

Bridge Street, Wrexham

Proposed residential development

Flood Consequences Assessment Addendum

Project ref:	4183 Bridge Street, Wrexham
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Background

- 1 This document has been prepared by Weetwood Services Ltd ("Weetwood") on behalf of Lingar Group.
- 2 Weetwood prepared a Flood Consequences Assessment (FCA) v1.2 report dated 22 August 2018 which was submitted to Wrexham County Borough Council (WCBC) in support of a planning application (ref: P/2018/0915).
- 3 A consultation response letter from Natural Resources Wales (NRW) dated 15 July 2019 (**Annex 1**) has raised four concerns. NRW advised that 'if no further information is submitted' then they would object to the application.
- 4 This FCA Addendum provides this information and addresses the concerns raised by NRW. It must be read in conjunction with the FCA v1.2 report.

NRW Concerns

- 5 *Compliance with A1.14 of TAN15 has not been demonstrated as sections of the site (e.g. car parking area) are shown to flood during the 1% annual probability (climate change and blockage event). The residential car parking should be treated as Highly Vulnerable development and should be designed to remain flood free.*
- 6 *There is some uncertainty as to whether blockage of the Island Green culvert would pose greatest flood risks to the site.*
- 7 *Offsite flood risks have been identified within the FCA and these could further increase should additional land raising be required on the site.*
- 8 *There is a lack of information within the FCA as to the flood hazards (flood depths and flood velocities) that future users of the development could be exposed to, so the decision maker does not have the necessary information to make an informed decision.*

Compliance with A1.14 of TAN15 (Refer to Paragraph 5)

- 9 For proposed highly vulnerable development, NRW require the entire development including all residential buildings, garden areas and driveways/parking to be shown to be flood-free during a 1:100 plus climate change (+CC) annual probability event in accordance with their interpretation with A1.14 of TAN15.
- 10 As presented in Appendix C of the FCA v1.2 report, the site is expected to remain entirely dry during the above event. However, whilst not specified in policy A1.14 of TAN15 NRW insists that a culvert blockage should be accounted for.
- 11 When accounting for a 100% blockage of the upstream culvert structure located at Island Green, the car parking area may partially flood to a shallow depth. An extract taken from Appendix E of the FCA v1.2 report is presented in **Figure 1** which also outlines the area of concern that NRW refers to.



Figure 1. Weetwood Modelled 1:100 +CC (20%) AEP Blockage Event; Max Flood Depths

- 12 In terms of the car parking area, in order to prevent this from flooding ground levels would need to be increased within that area of the car park. However, by doing this, increasing flood risk elsewhere is likely to become a more significant issue, which is also a concern raised by NRW (refer to paragraph 7 above). Also, it is not feasible to raise ground levels adjacent to the existing building in the north of the site.
- 13 As shown in **Figure 1**, it is only a small section of the proposed car park that is shown to flood during this scenario, with most of the car park remaining entirely dry. Furthermore, flood depths are relatively shallow being less than 300 mm but generally less than 100 mm which is not expected to pose a significant risk (refer to Hazard Ratings in **Figure 2**). Such flood depths in these circumstances (i.e. a 100% culvert blockage scenario) within a small portion of the car park should, we feel, be considered as acceptable.

Blockage Clarification (Refer to Paragraph 6)

- 14 NRW states that the FCA v1.2 report has focussed on blockage risks solely from the Island Green culvert, and that the FCA should also assess the risks from blockages of the Town Centre culvert and the St. Giles Way culvert.
- 15 However, in Section 4.4.3 of the FCA it is clear that our assessment has considered both the Island Green culvert and the St Giles Way culvert, with the former proving to be a worst-case scenario.
- 16 In terms of the Town Centre culvert, this was not considered within the FCA given its location being way upstream of the site.
- 17 Please note that the hydraulic modelling data provided to Weetwood by Wrexham County Borough Council that was utilised as part of the Weetwood FCA v1.2 report has assessed 8 blockage locations along the River Gwenfro including the 3 aforementioned culverts. In order to select the most appropriate blockage scenario to utilise for the FCA v1.2 report Weetwood assessed the modelled outputs from all 8 blockage locations.
- 18 For the avoidance of doubt the modelled flood levels at the site during the 1:1,000 annual probability event including 100% blockages to culverts at Island Green, St Giles Way and the Town Centre are 76.49, 76.26 and 76.09 m AOD respectively.
- 19 Therefore, the FCA v1.2 report has correctly assessed the impact of a blockage of the Island Green culvert, which is considered to be the worst-case scenario for the site.

Offsite Flood Risks (Refer to Paragraph 7)

- 20 NRW points out within its consultation response letter that there is a small area near the post office located off Town Hill that shows potentially more significant increased flood risk elsewhere; however, a review of the modelled outputs confirms that this is considered to be attributed to modelling anomalies and does not present actual increases expected within that area.
- 21 NRW state that offsite impacts may increase should the car park be raised to satisfy its concern outlined in Paragraph 5 above; however, as explained in Paragraphs 9 to 13 Weetwood do not consider it to be appropriate to raise ground levels.
- 22 Currently, the impact on flood risk elsewhere is considered to be negligible and flood risk in the proposed car park is considered reasonable.

Flood Hazards (Refer to Paragraph 8)

- 23 The Hazard Rating has been calculated using the formula **HR= d x (v + 0.5) + DF** (where d = depth, v = velocity and DF = debris factor), which has been sourced from the DEFRA FD2320/TR2 Technical Report.
- 24 The Hazard Rating for the site has been output directly from the hydraulic model using the 'conservative' land use function; this assumes a debris factor of 0.5 for flood depths between 0 and 0.25 m and 1.0 for flood depths above 0.25 m.
- 25 The results are presented in **Figure 2** below for the 100% culvert blockage scenario (i.e. the worst-case scenario). These show that the proposed car parking area would generally be expected to have a 'very low' Hazard Rating. This is considered an acceptable level of risk given the likelihood of causation i.e. the 1:100 +CC (20%) annual probability event coinciding with a 100% blockage of the Island Green culvert.

- 26 The proposed new residential building is accessed from the south of the site, which is expected to remain flood free. Therefore emergency access and egress should be available in all flood events.
- 27 The Flood Hazard to existing building in the north and its associated access and egress route will remain the same as per the existing situation. However, it should be noted that access to the existing building from the southern portion of the site may improve post development.

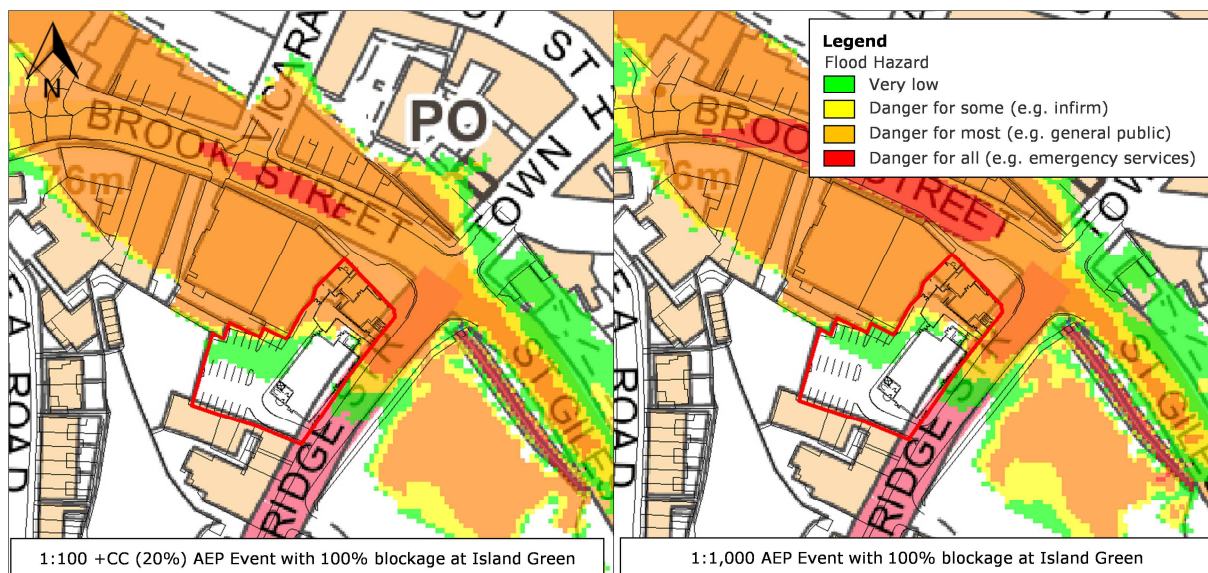


Figure 2. Hazard Ratings; Proposed Scenario

Summary and Conclusions

- 28 It is not considered feasible (see Paragraph 12) to raise the proposed car parking area for it to remain entirely flood free during the 1:100 +CC (20%) annual probability event including a 100% blockage of the Island Green culvert. Whilst this is sought by NRW in accordance with their interpretation of A1.14 of TAN15, the Hazard Rating (see Paragraph 25) for this unlikely combination of events is considered acceptable for a car parking area. Furthermore, most of the car park and access point is shown to remain dry.
- 29 Further information has been provided with respect to calculated Hazard Ratings using a conservative debris factor. Within the car parking area a 'very low' Hazard Rating is expected.
- 30 The off-site impacts on flood risk shown in the FCA v1.2 report are either shown to be negligible or owing to modelling anomalies.



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