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31/10/07

FAO Mrs Gwen Howard, Planning Liaison Officer

Dear Sir/Madam

Kinderlee Mill, Chisworth- LT/2007/102533/01-L01

We refer to your letter of 31 July 07 to High Peak. Balfour Homes have arranged river cross sections and we have rebuilt the original Hec Ras model using 4.0 beta. We attach the cross section positions plus the model output sheets, also a CD containing the model files and the river cross sections from RJP surveys plus site photos in dated folders.

To respond to your queries

1. There are no out of bank spills at the culvert inlet or upstream
2. For risk flows we have not used WINFAP as we were not comfortable with the derived figure and we attach the REFSR/FEH audit sheet
3. The culvert flows are supercritical.

We have also provided surface water information as the previous report was a PPG 25 report. Please email us should you have further queries.

Yours faithfully

[redacted]

M.E.Lambert
Cc
Dave Morley, Balfour Homes

Dave
Thanks for the hand delivered drawings. I have sent them to the EA. Please can you get Humes to email survey info + proposals EA first in case we get FRA queries
Mike

Kinderlee Mill, Chisworth

Flood Risk and Surface Water Assessment

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1.0 Introduction

Chisworth is to the north east of Manchester between Marple and Glossop. It has a group of Victorian mills based in a valley with a moorland stream providing water for the mills. Kinderlee mill is built over the stream which was put into culvert under the mill yard over a length of 160 metres. Upstream of the mill there is an offline storage pond which is currently not used. All the stream water flows down the mill culvert and away towards the Etherow.

2.0 Executive summary

The mill stream has a 1 in 100 year plus climate change risk flow of 9.6 m3/sec and the mill culvert is able to pass this flow under surcharge with predicted water risk levels at mill yard level under part blocked conditions. The mill is not at risk from 1 in 100 year plus climate change flows. The mill culvert appears to be in reasonable condition with a regular uniform arch roof shape. There is a small offline water storage pond upstream of the mill which is currently not in use as all flow passes through the site in the stream, this does not fall under the Reservoirs Act as its volume is less than 25,000 m3.

3.0 River catchment and flows

The mill stream catchment is 3.22 km2 in area with a length of 1.77 km and a steep average slope of 170.5 m/km. The catchment is rural with URBEXT at 0.004 and a lower than average runoff SPRHOST of 32.1% indicating absorbent soils.

To establish risk flow rates we first used WINFAP software and formed a pooling group of similar ungauged catchments. The computer analysis of the pooling group showed a 1 in 100 year risk flow of 4m3/sec. which is low for a South Pennine moorland catchment. We then used the Flood Estimation Handbook quick method in the form of a spreadsheet with an input of catchment descriptor values and this arrived at a 1 in 100 year flow value of 7.1m3/sec which is double the FEH pooling group value. Our experience of the quick method in the pennines is that it substantially overpredicts and that a WINFAP pooling group statistical analysis is to be preferred. However, in this case we are not comfortable with 4m3/sec despite the lowish percentage runoff and have used 8 m3/sec which is a conservative value.

4.0 Survey data and inspection

RJP Surveys have surveyed cross section positions set by us and this has given culvert invert levels at the exit, next to the main building in the yard, and upstream of the mill next to the lake. We have inspected all 3 entry points and photos of culvert condition at these points are available. The culvert in general appears in reasonable condition with a good arch shape consisting of mortared stones and no sign of flattening. Downstream of the mill yard entry point the culvert is rectangular with a roof of transverse RSJ's with concave mesh shuttering in between used as a former for the concrete above and then rendered producing a set of jack arches.

5.0 Hydraulic modelling

The invert levels and culvert sizes have been used to construct a Hec Ras 4.0 beta hydraulic computer model. Even with the conservative flow figure the system does not flood out onto the ground under 1 in 100 year conditions. Adding a 20% flow increase to allow for climate change, risk water levels inside the mill year access point are below mill year level. At the 1% + CC flow of 9.6 m3/sec flow is backing up at the upper culvert inlet but is below bank level so there is no spill risk upstream of the mill.

6.0 Existing and proposed drainage

The existing mill surface water drains to the mill culvert. There is also land drainage runoff from land to the south which has its own piped system through the existing mill. We investigated this for Loxley Homes in 2000 and attach a diagram showing the hillside culvert J entering the site.. This connects to the mill culvert. The yard areas and the mill all drain to the mill culvert.

The proposed drainage will repeat this and the hill side groundwater will be connected into the proposed system. Hard areas are similar and the rate of runoff will not increase.

The mill feed water pond upstream of the mill is an offline pond. This is to be retained as a natural feature and will have a trickle flow feed pipe from the stream channel but will not take storm flows.

7.0 PPS25 matters

The proposed use is classed as 'more vulnerable'. The site is flood zone 1 and 2 as shown by the river model work. A 1 in 100 year plus climate change flow of 9.6 m3/sec stays underground in the existing mill culvert.

Housing is suitable for flood zones 1 and 2 and is 'appropriate'. The existing mill complex area was approx 5300 m2 and the proposed hard area will be approx 5000 m2. There is thus a small reduction in hard area. Based on a 1 in 2yr urban storm and the Building Regulations Approved Document H design criteria for surface water runoff of 0.014 l/sec/m2 the existing surface water runoff rate is 74 l/sec and the new overall surface water runoff rate will be 70 l/sec. There will thus be no increase in flood risk to others downstream. Based on an urban storm rain total of 30 mm the volume of water generated by the existing site is 159 m3 and the proposals will generate 150 m3.

8.0 Attachments

a. Location plan
b. EA website indicative floodplain map
c. Existing site plan
d. Proposals
e. WINFAP printouts
f. Hec Ras printouts