



DRAFT - Credenhill Flood Report – 15th/16th February 2020

Background

On the night of 15th February, morning of 16th February, following several days of unprecedented rainfall onto land already saturated by the wettest winter on record, several properties in Credenhill Parish experienced flooding from surface water. This report aims to highlight the issues to the necessary parties and put forward any steps that can be taken going forward to prevent it from happening again and to reduce flood risk.

Areas Affected

Well Cottage
2 The Barlands
Glebe Close (numbers 57 – 70, 36-44 & 20.)
Mill Farm
Mill Farm Stables

Flood history of each site

Well Cottage - Well cottage has a long history of flooding in the basement, the route cause is surface water from the hill and adjacent roads.

2 The Barlands – This is the 4th time in 3 years that this property has flooded in the lounge/dining room/kitchen & garden. The route cause is surface water from the hill and adjacent road.

Glebe Close – This is the first time in 30 years that there has been a problem with flooding.

Mill Farm & Mill Farm Stables – Historically these properties flooded, being at the lowest point in the village and next to the Brook it is where surface water naturally runs. However, since the flood alleviation scheme and significant improvements made to the drainage by the present owner at Mill Farm this is the first time there has been an issue in four years.

Incident Report

The below table shows the Yazor Brook level at the gauge below Credenhill at Three Elms

| Date | min_level (m) | avg_level (m) | max_level (m) |
|------------|------------------|------------------|------------------|
| 13/02/2020 | 0.188 | 0.483 | 0.63 |
| 14/02/2020 | 0.201 | 0.301 | 0.46 |
| 15/02/2020 | 0.191 | 0.321 | 0.758 |
| 16/02/2020 | 0.759 | 0.985 | 1.28 |
| 17/02/2020 | 0.36 | 0.529 | 0.727 |
| 18/02/2020 | 0.314 | 0.331 | 0.352 |
| 19/02/2020 | 0.24 | 0.321 | 0.358 |

The maximum level on 16/02/2020 at 1.28m is the highest level ever recorded on the gauge.



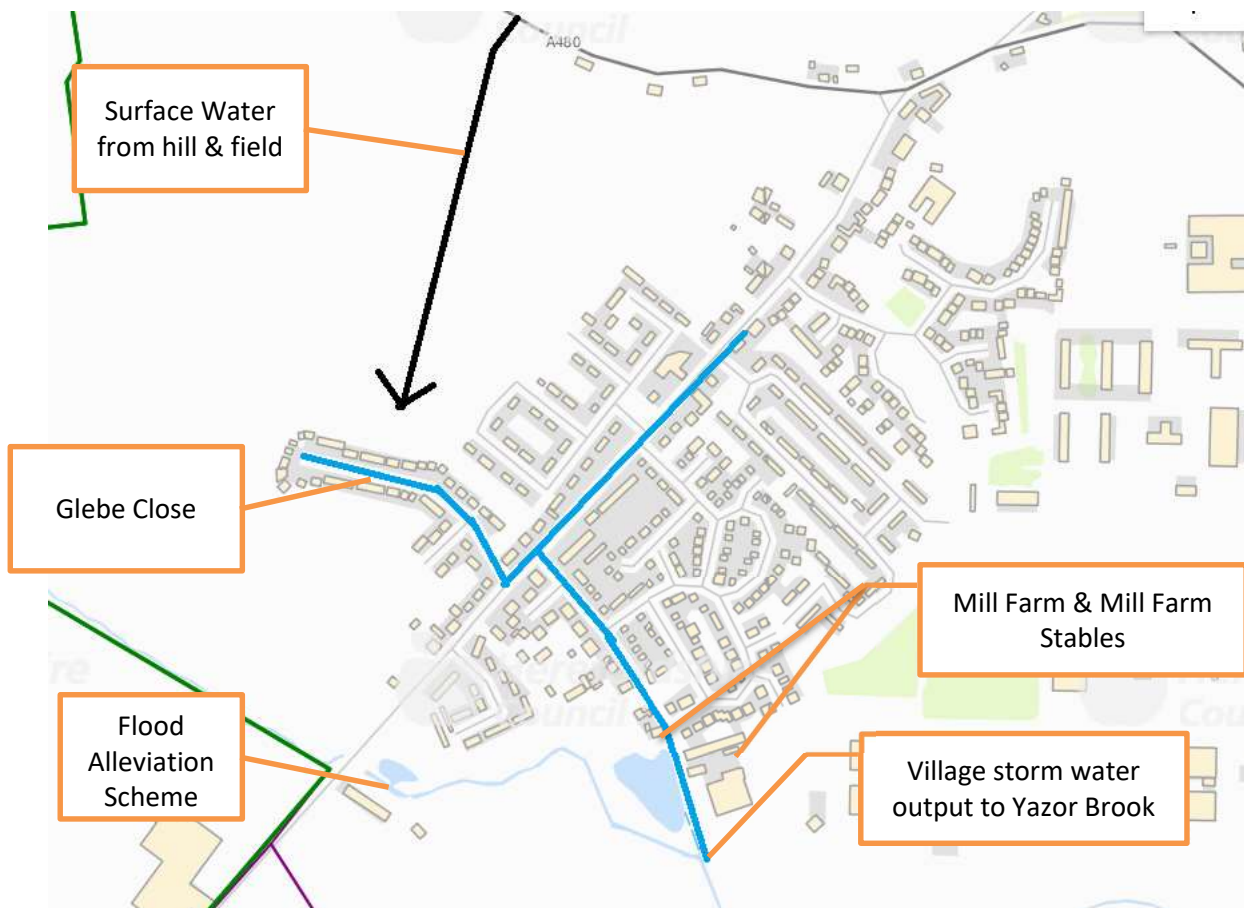
The Yazor Brook runs west to east along the south boundary of Mill Farm and Mill Farm stables.

The rainwater storm drains for the village output to the Yazor Brook between Mill Farm and Mill Farm Stables, the pipe is approx. 40cm diameter. The Brook in normal conditions is 15cm below the bottom of the pipe.

The height of the brook on the 16th February during the night was such that the back pressure from the Brook meant that storm water was not able to drain into the Brook. This resulted in the Mill Farm and Mill Farm Stables flooding.

Surface water from Glebe Close between numbers 36 & 45 was also unable to drain effectively into the storm water drain. It is unclear if this was due to a blockage in the drains or if the water had backed up from the Brook.

At the same time water from the hill had ran onto the A480 and was entering the farmers gate at the north of the field to the rear of glebe close.

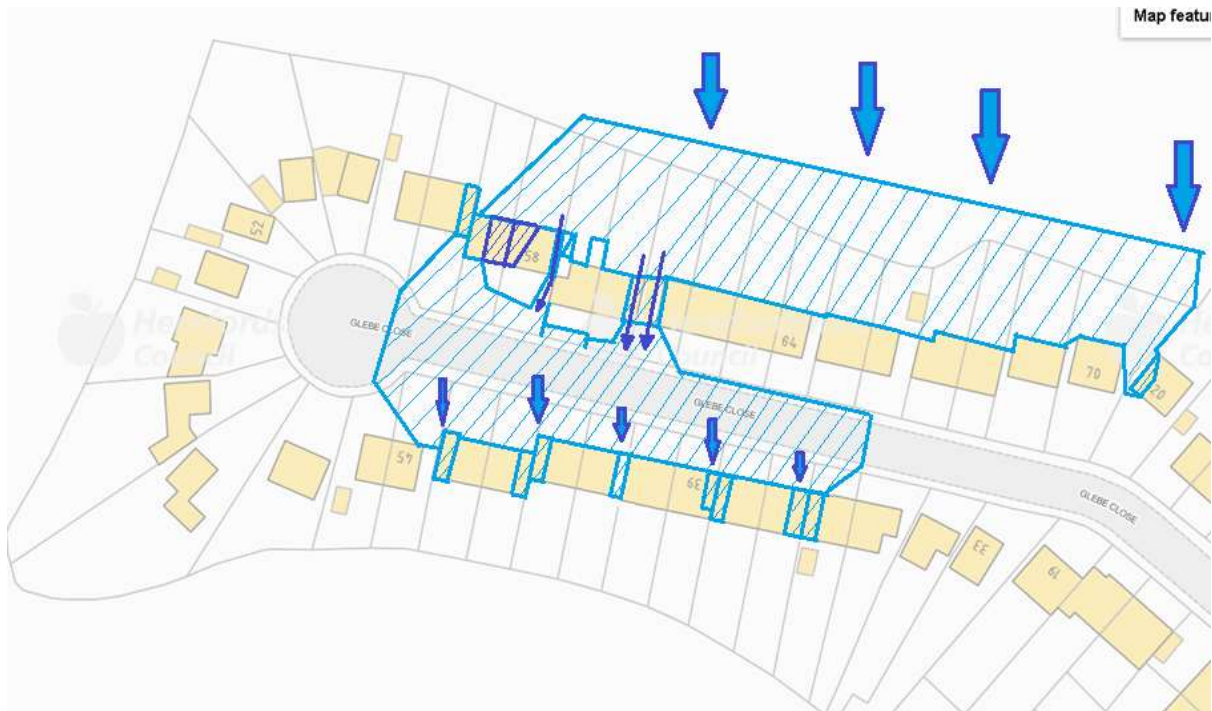


The water followed the lie of the land, helped by several compacted tractor tracks down to the properties directly downhill of the gate. The field was unable to take the additional water due to the unprecedented amount of rain during the winter and therefore congregated at the rear of the properties to the north side of glebe close (numbers 57 – 70). Property owners became aware of the build up at around 3am. Numbers 60 and 61 opened their rear and front garage doors to prevent the water from getting into their homes. This allowed the water to drain from the rear of the properties through onto the road. However, due to the issues with the drains the water was unable to drain effectively from the road. The homes to the south side of Glebe Close, being lower than the road



surface, then started to get surface water build up in front of their properties and enter their garages that are at ground level. The fire brigade arrived in time to pump water down the road to prevent any homes on the south side of glebe close from flooding. 2 properties at the north side (no57 & 58) were flooded by 1cm in their living areas. The surface water drained gradually over the next 24 hours.

The below diagram shows the homes affected; this was created by speaking to homeowners in Glebe Close (See appendix 1):



The following images show the extent of the flooding during the incident:



No.43 looking towards 58



No.60 Looking towards No.42



No.60 Looking towards field.



The below images show the field the next morning after the incident:



The below image shows the compacted tracks in the field (image taken after the water had drained):





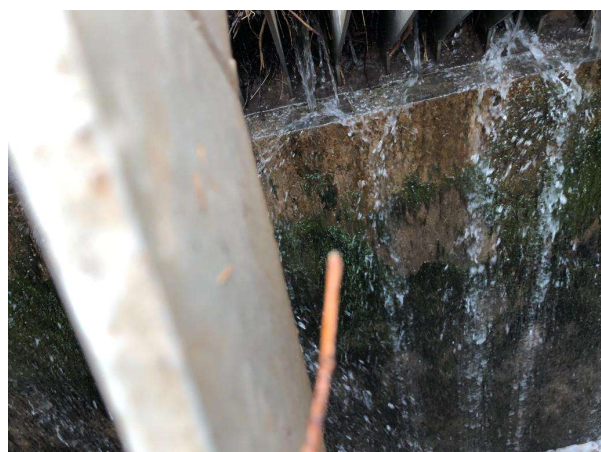
Flood Alleviation Scheme at 11am on 16th February compared to normal winter level



While compiling this report it was established that a resident had cleared the grill on the flood alleviation scheme at 11.15am on 16th February 2020, the below images show the effect of clearing the grill.

Images show the difference in flow between a cleared grill and a blocked grill

Blocked Grill:



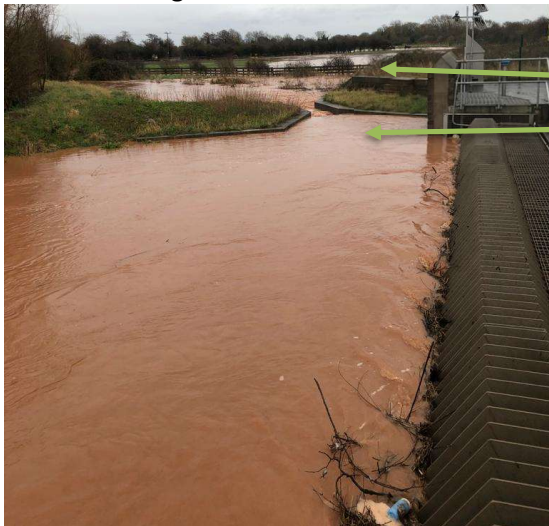


During clearing:



Flood Alleviation Scheme on 16th February 2020 at 12:00pm (after a resident had cleared the grill)
compared to before.

Before clearing



After clearing



Clearing of the grill reduced the level significantly in less than an hour; it also allowed the field to drain and prevented the brook from flowing into the field.

Shaping the future of Credenhill



Conclusions

The amount of rain during the days leading up to the incident was unprecedented. The County Council have declared a climate emergency which recognises that these extreme weather patterns are becoming more frequent. It is therefore important to review and identify where improvements can be made to make us more resilient to future events. Several suggestions/recommendations are listed below:

Field Drainage Improvements

The field to the rear of Glebe Close has a hedgerow and ditch at the foot of the top field. Surface water is not currently managed on the site and the ditch is overgrown. The ditch runs away from the glebe close properties downhill towards the Yazor Brook. If the ditch was cleared and gullies were created to take water from the upper field, then any excess water from the hill and A480 would be directed towards the Yazor Brook and away from the properties in Glebe Close. See below proposed solution



Another solution would be to create a ditch and ridge to the rear of the Glebe Close properties. The farmer could also farm the land in a direction leading away from the properties so that the tram lines follow the slope towards the Yazor Brook instead of the slope towards the homes.

Glebe Close/Station Road/Mill Lane - Road Drain Cleansing

Surface water was not able to drain properly from the road. The drains need to be cleared and we need to establish if the inability to drain the road properly was because the drains are blocked or if the drains were overwhelmed due to backing up of the Yazor Brook at the output pipe located at the end of Mill Lane.

A480 Road Drainage Improvements

The properties along the A480 (The Barlands and Well Cottage) have ongoing problems with poor surface water drainage from the A480. Extra drains to be added to the road between the hill and the Barlands to prevent this ongoing issue.



Improve Flood Alleviation Scheme Efficiency

It is clear from the images of the scheme being cleared that keeping the grill clear is an essential part of running an efficient scheme. If the grill had been kept clear then arguably the brook would never have reached the levels that caused flooding at the levels that were seen throughout the city (Roman Road, Three Elms, Ledbury Road - Texaco Garage). The backing up of the drainage pipe on Mill Lane, caused by the abnormally high level of Yazor Brook, which in turn caused Mill Farm & Mill Farm Stables to flood; would this of happened if the grill had been kept clear?

The culverts contain remote level sensors and the scheme has cameras to monitor the grill, could these be used to trigger an emergency response to ensure that Balfour Beatty are called out to clear the grill regardless of time/day? A 2-person team clearing the grill to ensure that the water is shepherded down the pipe would be better than having to deal with problems reactively after the event.

An experiment was conducted on Sunday 1st March 2020 during normal winter level conditions, the grill was cleared, and the level drop was observed as follows:



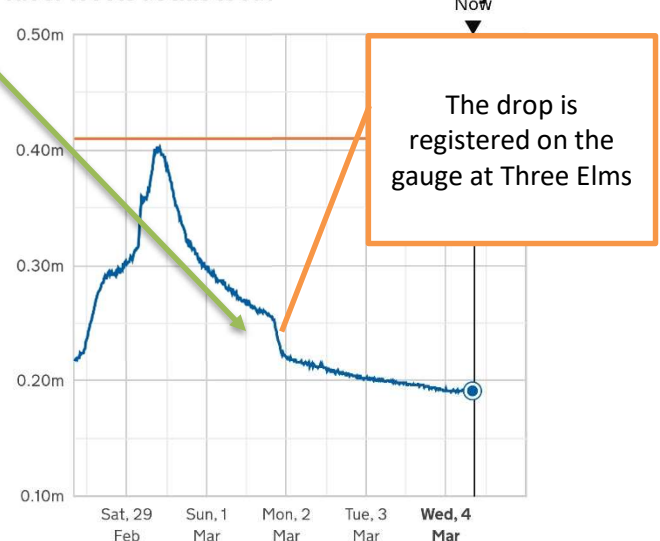
River level

Yazor Brook at Three Elms

[Check for flood warnings in this area](#)

Latest recorded level **0.19m** at **8:00am**
Wednesday 4 March 2020.

River levels at this location in the last 5 days



Whilst not a large drop the experiment does show that debris in front of the grill has a significant effect on the brook level and the scheme has a significantly larger capacity when clear.

The core strategy, supported by the Strategic Flood Risk Assessment (https://www.herefordshire.gov.uk/download/downloads/id/4864/strategic_flood_risk_assessment_update_-_february_2015.pdf) relies heavily on an effective FAS scheme in Credenhill to allow for development of land within Hereford.



Appendix 1

Glebe Close residents survey

| Number | Affected? | Areas Affected | | | | | | Other Information |
|--------|-----------|----------------|----------------|-------|--------------------|------|------|--|
| | | Garden | Garage/Utility | House | Drive/Front garden | Path | Road | |
| 33 | X | | | | | | | |
| 34 | X | | | | | | | |
| 35 | X | | | | | | | |
| 36 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 37 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 38 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 39 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 40 | ✓ | X | X | X | ✓ | ✓ | ✓ | |
| 41 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 42 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | |
| 43 | ✓ | X | ✓ | X | ✓ | ✓ | ✓ | Fire engine prevented house flooding. |
| 44 | ✓ | X | X | X | ✓ | ✓ | ✓ | |
| 45 | ✓ | X | X | X | ✓ | ✓ | ✓ | |
| 46 | X | | | | | | | |
| 47 | X | | | | | | | |
| 48 | X | | | | | | | |
| 49 | X | | | | | | | |
| 50 | X | | | | | | | |
| 51 | X | | | | | | | |
| 52 | X | | | | | | | |
| 53 | X | | | | | | | |
| 54 | X | | | | | | | |
| 55 | X | | | | | | | |
| 56 | ✓ | ✓ | ✓ | X | ✓ | ✓ | ✓ | |
| 57 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Living Room, Dining Room, Kitchen, Hall and Utility all had a small amount of water damaging carpets and flooring. |
| 58 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 59 | ✓ | ✓ | X | X | ✓ | ✓ | ✓ | On holiday during incident |
| 60 | ✓ | ✓ | ✓ | X | ✓ | ✓ | ✓ | Opened utility/garage doors at front and back to allow water to pass through to prevent house from flooding. |



| Number | Affected? | Areas Affected | | | | | | Other Information |
|--------|-----------|----------------|----------------|-------|--------------------|------|------|--|
| | | Garden | Garage/Utility | House | Drive/Front garden | Path | Road | |
| 61 | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | Opened utility/garage doors at front and back to allow water to pass through to prevent house from flooding. |
| 62 | | | | | | | | |
| 63 | | | | | | | | |
| 64 | | | | | | | | |
| 65 | | | | | | | | |
| 66 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| 67 | | | | | | | | |
| 68 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| 69 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | |
| 70 | | | | | | | | |
| 20 | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ | |

Appendix 2

Mill Lane survey

| Property/Land | Information |
|-----------------------------|---|
| Mill Farm | Conservatory/Lounge/Hall/Dining room and front porch/utility toilet flooded damaging flooring/curtains/furniture. Downstairs toilet filled and not able to flush. Welsh Water attended as did fire crew both unable to do anything. Ongoing enquiries with Herefordshire Council. |
| Mill Farm Stables | Fields/Livery Areas flooded as well as a number of barns up to 4 inches |
| French/Baxter Livery Fields | Fields were flooded causing distress to landowners and livestock. The field located to the east of the flood alleviation scheme has not previously flooded. Landowner observed the scheme being ineffective with very little water going down the offtake due to the grill being blocked. |