

Note to File

JBA Project Code 2018s0424
Contract Eden District Level 1 SFRA
Client Eden District Council
Date 5 March 2019
Author Hannah Bishop
Reviewer Mike Williamson
Subject Functional Floodplain Delineation



Eden Functional Floodplain

1 Introduction

Eden District Council (EDC) was unable to provide the GIS outline for the 2015 SFRA functional floodplain (Flood Zone 3b). The functional floodplain delineated as part of this 2019 SFRA is therefore 'from scratch', using the most up-to-date data available. The following methodology note explains the delineation process. The LPA, LLFA and EA must all agree on the extent of the functional floodplain outline and the methodology used. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The local knowledge of the council and EA is therefore crucial in defining the functional floodplain as robustly as possible.

2 Functional floodplain definition

2.1 Flood Risk and Coastal Change PPG – Table 1, Paragraph 065

The Flood Zones, referred to in the table below, show the probability of river and sea flooding, ignoring the presence of defences. Flood zones 1, 2 and 3 are included within the Environment Agency's [Flood Map for Planning \(Rivers and Sea\)](#). Flood Zone 3b is the functional floodplain and is not included in the Flood Map. This zone is for the use of LPAs and developers. Flood Zone 3a is Flood Zone 3 of the Flood Map that isn't functional floodplain.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)

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Flood Zone	Definition
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the [Strategic Flood Risk Assessment](#) when considering location and potential future flood risks to developments and land uses.

2.2 Flood Risk and Coastal Change PPG – Paragraph 015

The definition of Flood Zone 3b in Table 1 explains that local planning authorities should identify areas of functional floodplain in their Strategic Flood Risk Assessments in discussion with the Environment Agency and the lead local flood authority. The identification of functional floodplain **should take account of local circumstances and not be defined solely on rigid probability parameters**. However, land which would naturally flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood (such as a flood attenuation scheme) in an extreme (0.1% annual

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probability) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

A functional floodplain is a very important planning tool in making space for flood waters when flooding occurs. Generally, development should be directed away from these areas using the Environment Agency's catchment flood management plans, shoreline management plans and local flood risk management strategies produced by lead local flood authorities.

The area identified as functional floodplain **should take into account the effects of defences** and other flood risk management infrastructure. Areas which would naturally flood, but which are prevented from doing so by existing defences and infrastructure or solid buildings, will not normally be identified as functional floodplain. If an area is intended to flood, e.g. an upstream flood storage area designed to protect communities further downstream, then this should be safeguarded from development and identified as functional floodplain, even though it might not flood very often.

3 2015 functional floodplain

Text taken from the 2015 Level 1 SFRA report:

The Environment Agency have provided mapping to Flood Zone 3 information, this is enhanced by information relating to 1 in 20 year flooding which is taken to form the basis of the functional flood plain (or Flood Zone 3b). More specific modelling was made available for:

- Appleby: River Eden;
- Eamont Bridge: River Eamont; and
- Thacka Beck: Penrith.

4 Functional floodplain update

Based on the above guidance and definitions provided in the FRCC-PPG, the following modelled flood outlines (MFO) were provided by the EA to assist in the production of the functional floodplain:

Model/Watercourse	Year	Return period	Defended?
Appleby, River Eden	2014	20yr	Defended
Brockleymoor	2017	20yr	Defended
Great Ormside	2009	25yr	Unknown
Eden Tribs: Brough	2006	25yr	Undefended

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Model/Watercourse	Year	Return period	Defended?
Eden Tribs: Coupland	2006	25yr	Undefended
Eden Tribs: Kirkby Thore	2006	25yr	Undefended
Eden Tribs: Milburn	2006	25yr	Undefended
Eden Tribs: Newton Reigny	2006	25yr	Undefended
Eden Tribs: Skirwith	2006	25yr	Undefended
Eden Tribs: Warcop	2006	25yr	Undefended
Eamont	2013	20yr	Defended
Greystoke	2015	20yr	Defended
Kirkby Stephen	2017	20yr	Defended
Lowther	2006	25yr	Undefended
Maulds Meaburn and Crosby Ravensworth	2017	20yr	Undefended
Morland	2017	20yr	Undefended
Soulby	2017	20yr	Undefended
Stockdalewath	2017	20yr	Undefended
Thacka Beck, River Eamont	2013	20yr	Defended

Along with the above MFOs, the following datasets were also interrogated to assist with the delineation:

- EA's Flood Map for Planning Flood Zone 3 (November 2018);
- Functional floodplain from previous SFRA was unavailable;
- EA Flood Storage Areas (FSA) (November 2018);
- EA Areas Benefitting from Defences (ABD) (November 2018);
- EA Historic Flood Map (HFM) (November 2018);
- EA Recorded Flood Outlines (RFO) (November 2018);
- Urban areas - OSOpenMapLocal_Raster (to remove currently developed areas and transport infrastructure from functional floodplain).

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4.1 GIS methodology

- The above EA MFOs were merged together;
- Checked for consistency with Flood Zone 3 (November 2018 version). It was found that a number of MFOs were inconsistent with FZ3, therefore confirmation required from the EA. It appears that the Flood Map has not been updated with the appropriate models in the following locations (see Section 5 for screenshots of the locations):
 - Brock 2017 model, 20 year, defended MFO on River Petteril at Brockleymoore;
 - Maulds Meaburn and Crosby Ravensworth 2017 model, 20 year, undefended MFO on Lyvennet Beck near Maulds Meaburn (outside of YDNP);
 - Kirkby 2017 model, 20 year, undefended MFO on River Eden and Hartley Beck in Kirkby Stephen;
 - Moorland 2017 model, 20 year, undefended MFO on Morland Beck and Newby Beck at Newby and Morland;
 - Soulby 2017 model, 20 year, undefended MFO on Scandal Beck at Soulby;
 - Stockdalewath 2017 model, 20 year, undefended MFO on River Roe and River Ive.
- FSA dataset included in the outline – one FSA at Townhead, Penrith; and
- The HFM dataset, where there are historical fluvially flooded areas.
- Recorded flood outline from Greystoke, March 2019
- OS Open Data OSOpenMapLocal Raster Dataset was used to identify urban areas and transport infrastructure to be removed from the functional floodplain.
- Checks on the geometry of the 3b outline were carried out to ensure geometric correctness of the outline.

The functional floodplain outline should be assessed by the LPA, LLFA and the EA and any comments or questions should be referred back to JBA in order to agree on a final outline.

The extent of the functional floodplain outline produced from this SFRA should always be assessed in greater detail where any more detailed study such as a Level 2 SFRA or site-specific FRA are undertaken.

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5. Queries for the EA on the draft outline

There are several queries regarding EA datasets:

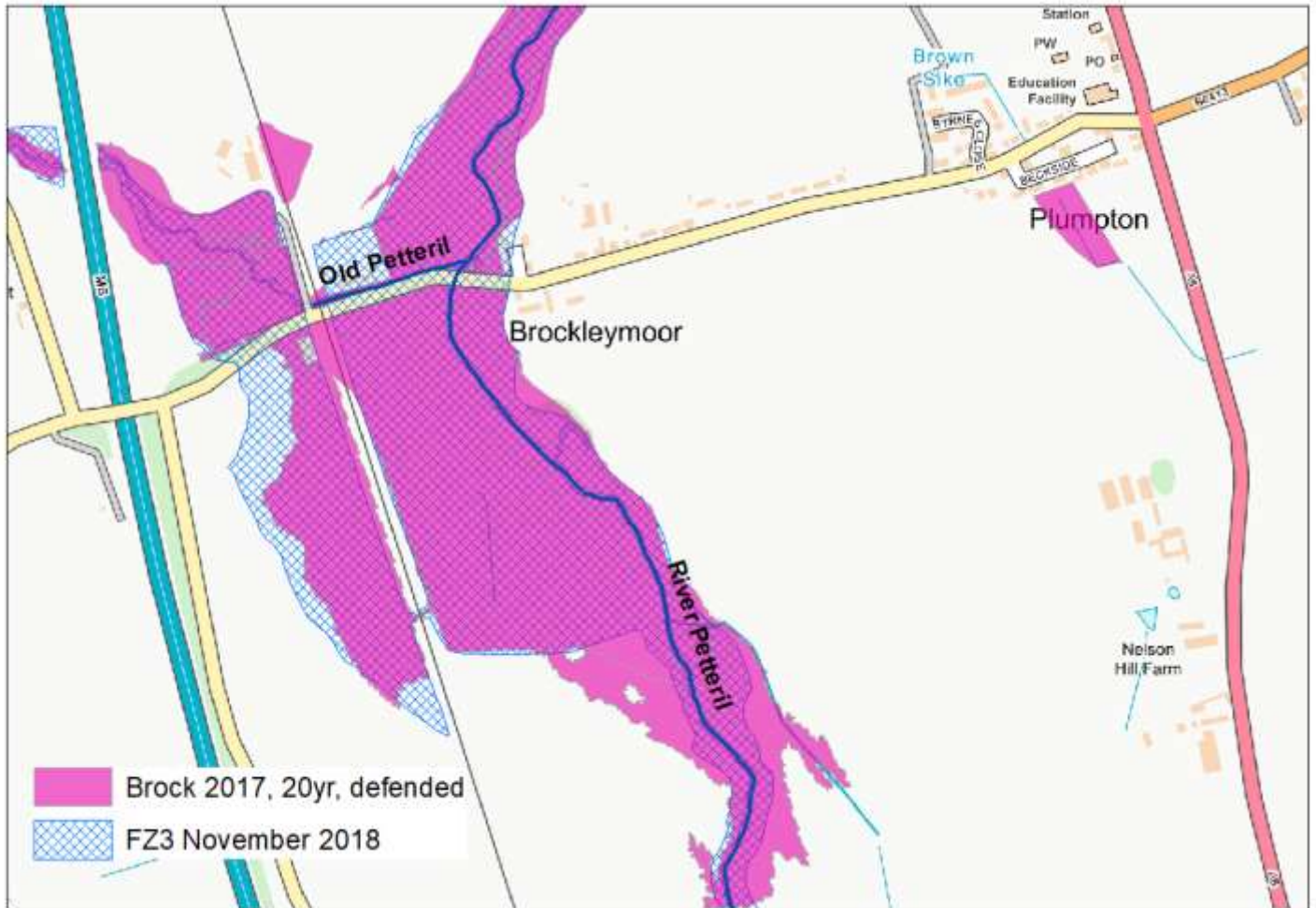
- Flood Map – as described in Section 4.1, it is apparent that parts of Flood Zone 3 have not been updated with up-to-date modelling. We need an explanation as to why this is and whether the Flood Map will be getting updated for these areas in the near future. Screenshots of such areas are provided below.
- We have included areas of the EA Historic Flood Map (HFM) dataset within the functional floodplain outline. Please confirm whether this is appropriate.

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Brock 2017

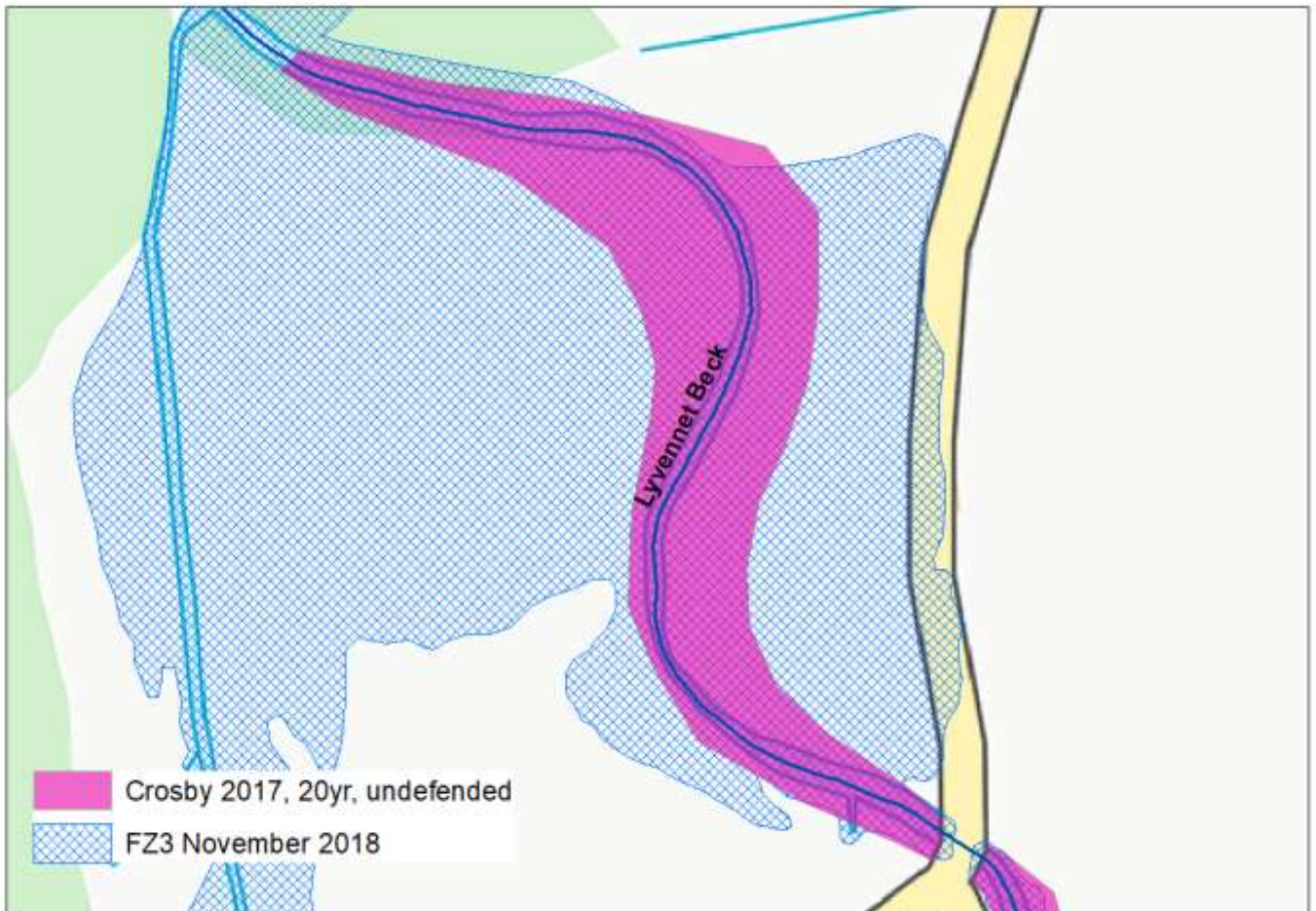


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Crosby 2017

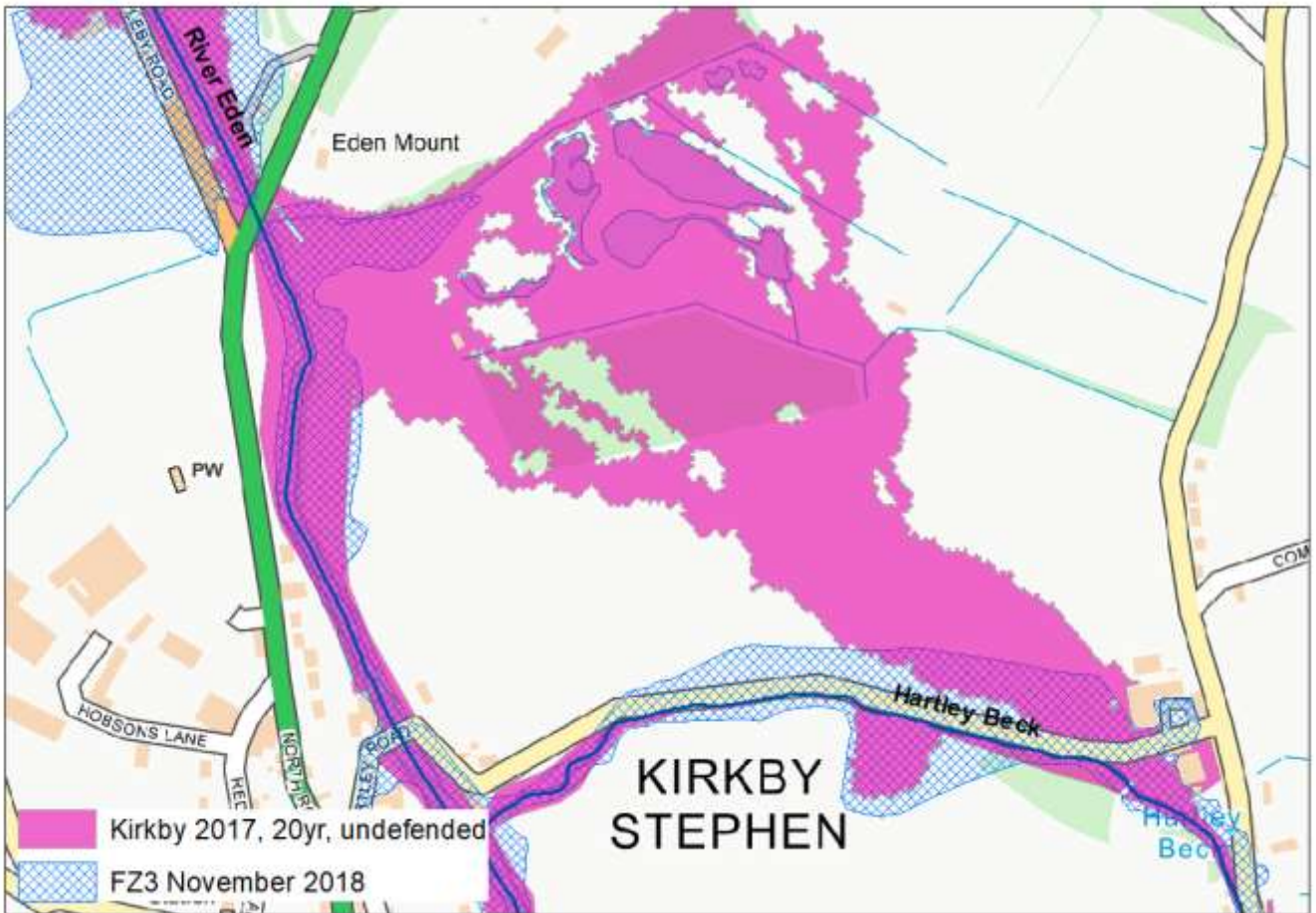


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Kirkby 2017

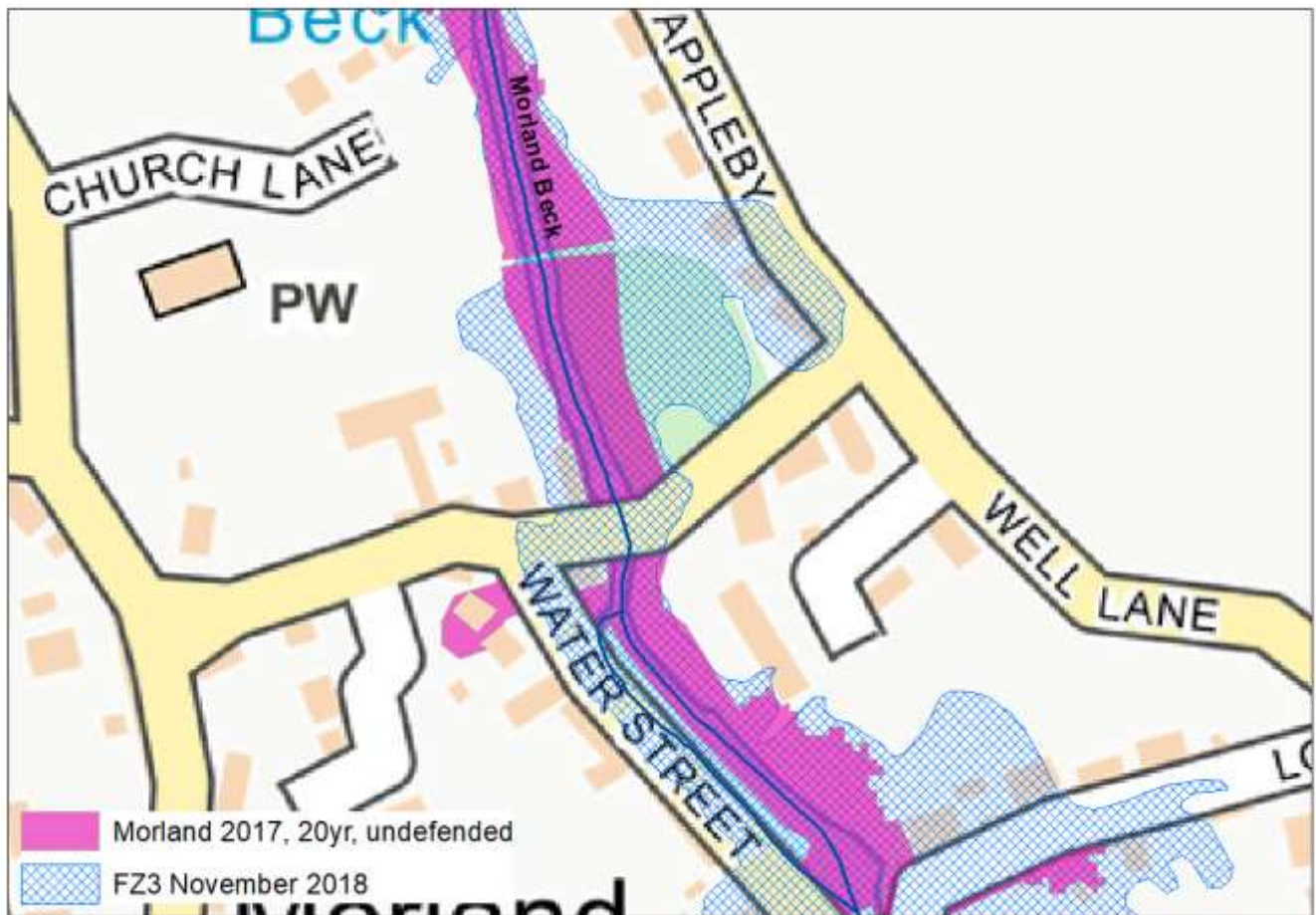


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Morland 2017

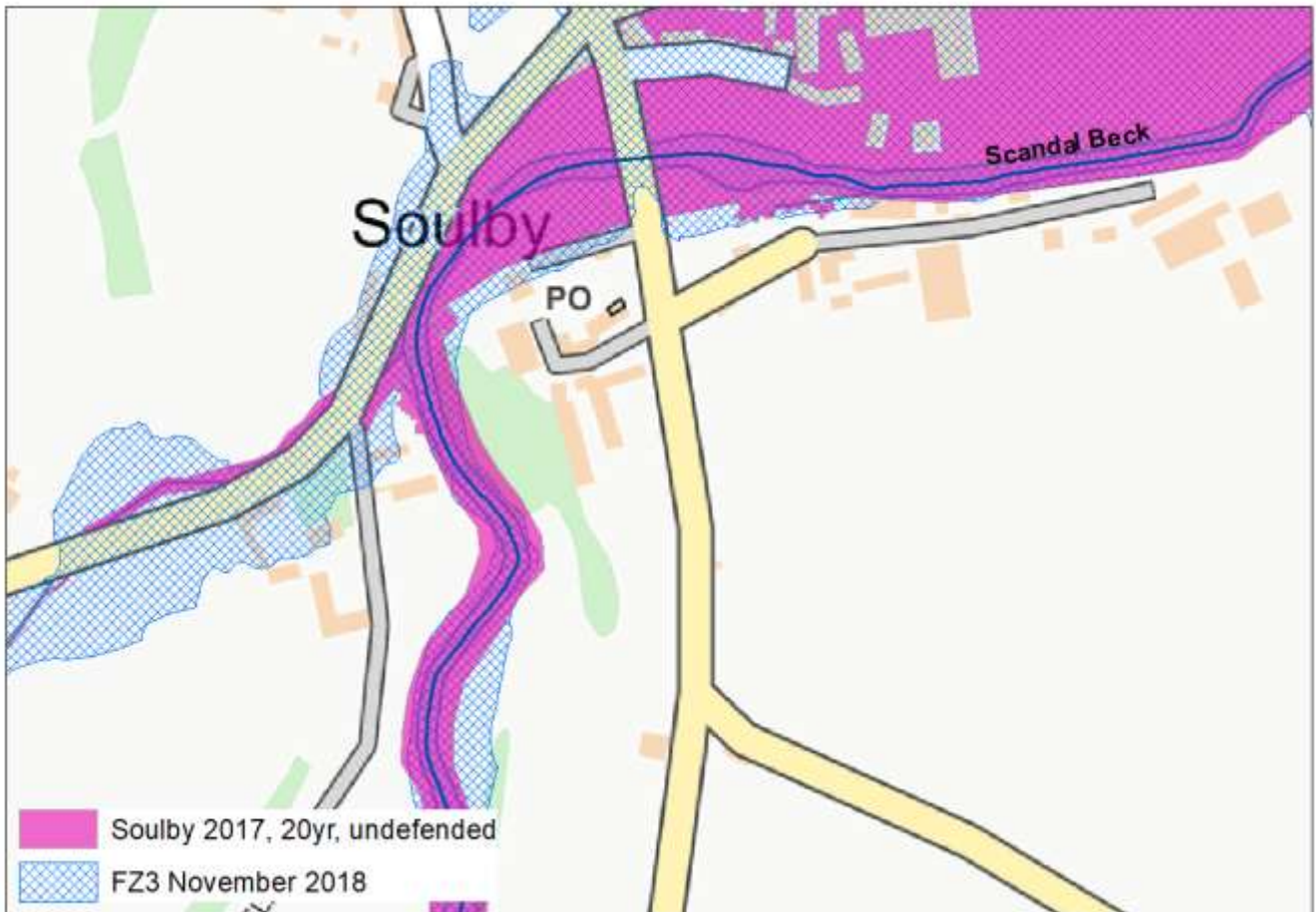


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Soulby 2017



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Stock 2017

