Friston Flood Study Report

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Document Control Sheet

BMT BMT Ltd Zig Zag Building, 70 Victoria Street, Westminster London SW1E 6SQ www.bmt.org	**Document:**	Friston Flood Study Report
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Synopsis: This is report for the Friston surface water study. It details the methodology for the creation of the hydraulic model, the results from baseline, 6th October Validation event and Do Nothing flooding assessment as well as details of potential mitigation schemes.		

REVISION/CHECKING HISTORY

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1 Introduction

Suffolk County Council commissioned BMT to analyse and assess the local surface water flood risk in Friston. Suffolk County Council as Lead Local Flood Authority (LLFA) has led the production of the Friston Flood Study.

1.1 Study Area

Friston is a small village and civil parish in the East Suffolk district, in the county of Suffolk. It is located 3 miles southeast of Saxmundham, and 4 miles northwest of Aldeburgh. Figure 1-1 shows the general location of the study area. To better understand the flood risk in Friston, this flood study has strived to collate all the available records of historic surface water flooding and surface water flood risk modelling. All data used in this study has been provided by Suffolk County Council through their own records and using newly commissioned survey data.

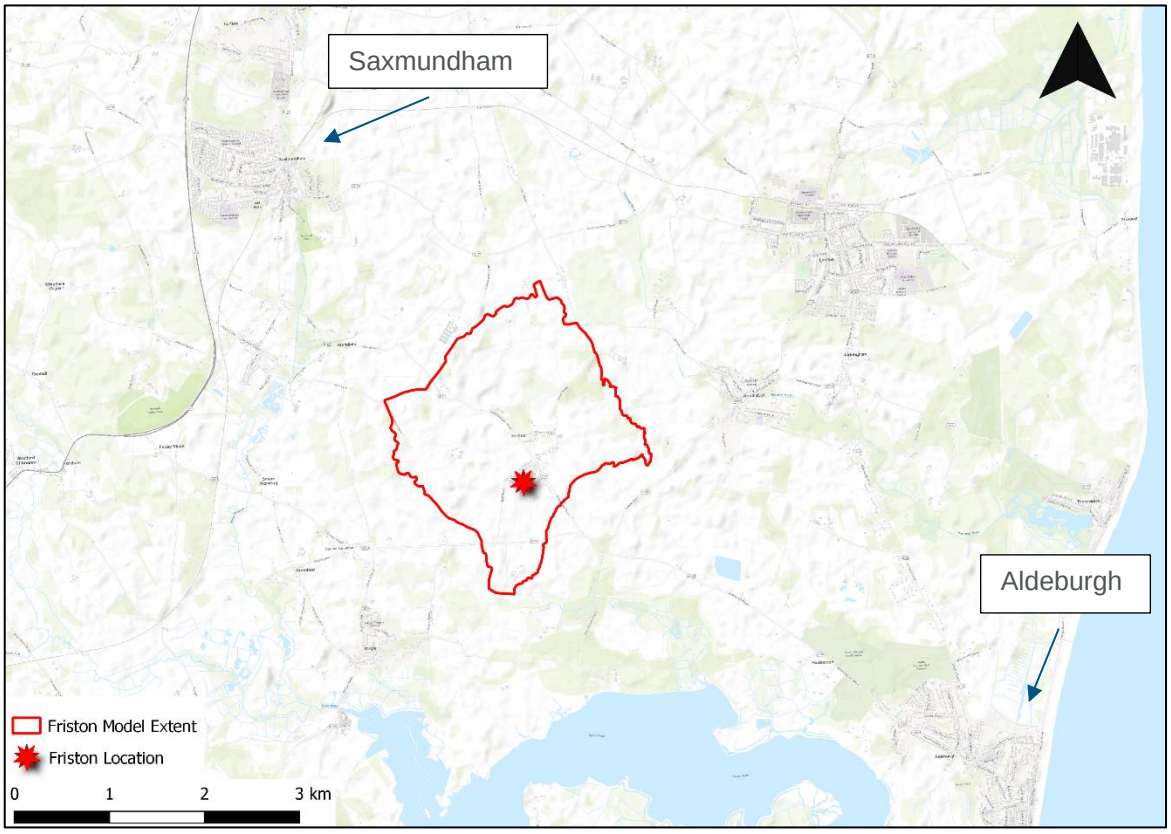

Figure 1-1 - Friston Location and Model Extent

2 Modelling

BMT were appointed as flood risk consultants to deliver the Friston surface water flood study as they are recognised experts in the field of flood modelling. BMT have a long history of delivering such projects, and also building, maintaining and developing flood modelling software which is currently used throughout the UK and globally. As part of this flood study, BMT have completed a new flood model for Friston Village which has been used to recreate and predict the risk of flooding within the catchment from surface water. BMT undertook a site visit with SCC in November 2019 where a walkover of the village and key flow surface water flow routes were assessed.

Previous modelling studies have been completed for specific analysis of Friston, however, these did not assess the entire catchment which drains into the village of Friston. BMT used historical models and surveys to compliment the newly commissioned survey collected for the 2020 flood study. These datasets all informed the building of a new surface water flood model.

On 6th October 2019, Friston experienced a significant flood event which led to flooding of access and egress roads including Saxmundham Road, Grove Road, Aldeburgh Road and Low Road (Figure 2-1). On the day of the flood event, both local residents and Suffolk County Council obtained detailed photographic evidence of the flooding occurring (Figure 2-2). Many of the photographs contained timestamps which enabled the comparison of the models predicted flooding to the observed event.

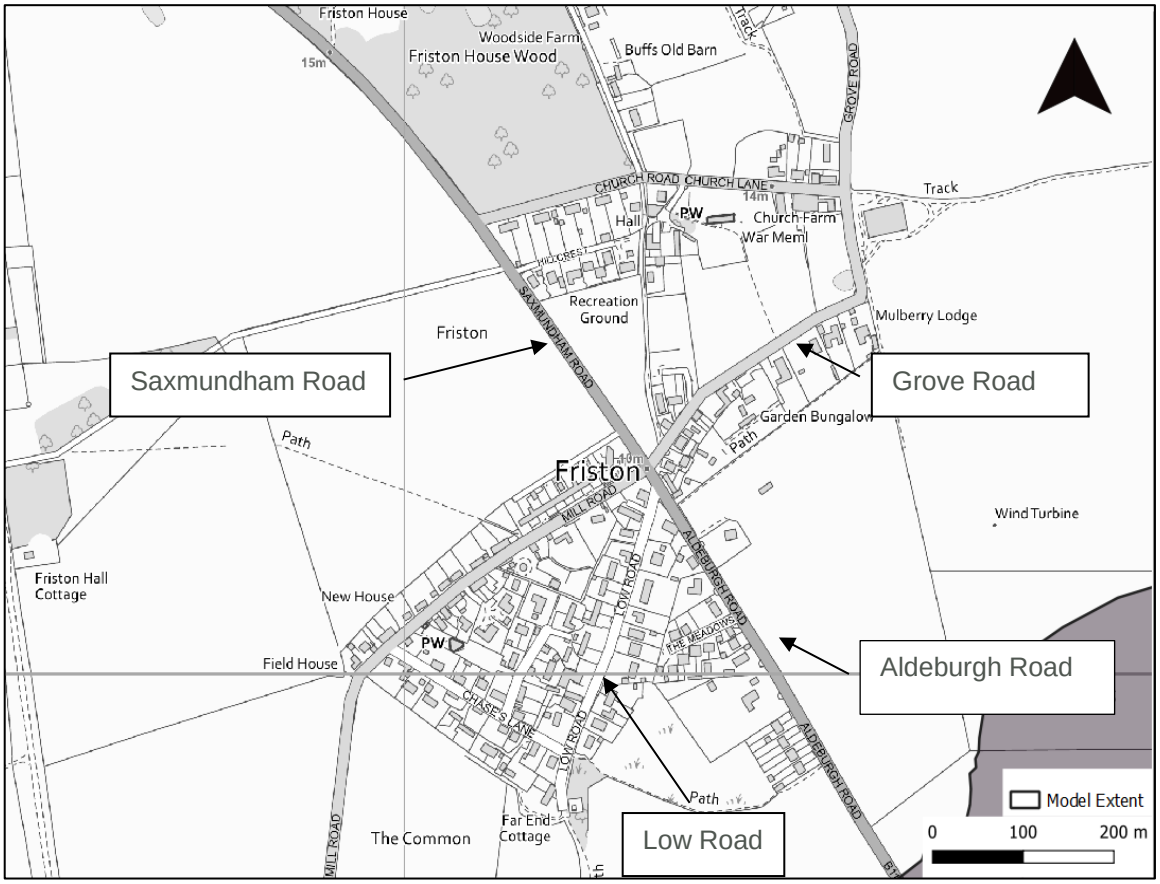

Figure 2-1 - Friston Village with Annotated Road Names

Figure 2-2 - Photograph of 6th October 2019 Event Provided by SCC

BMT requested the rainfall gauge data from the Environment Agency for Thorpeness which is the closest gauge to Friston (Figure 2-3). This rainfall gauge collect rainfall data every 15 mins (Figure 2-4), and by running the rainfall event through the BMT flood model, allowed the comparison of depths within the village.

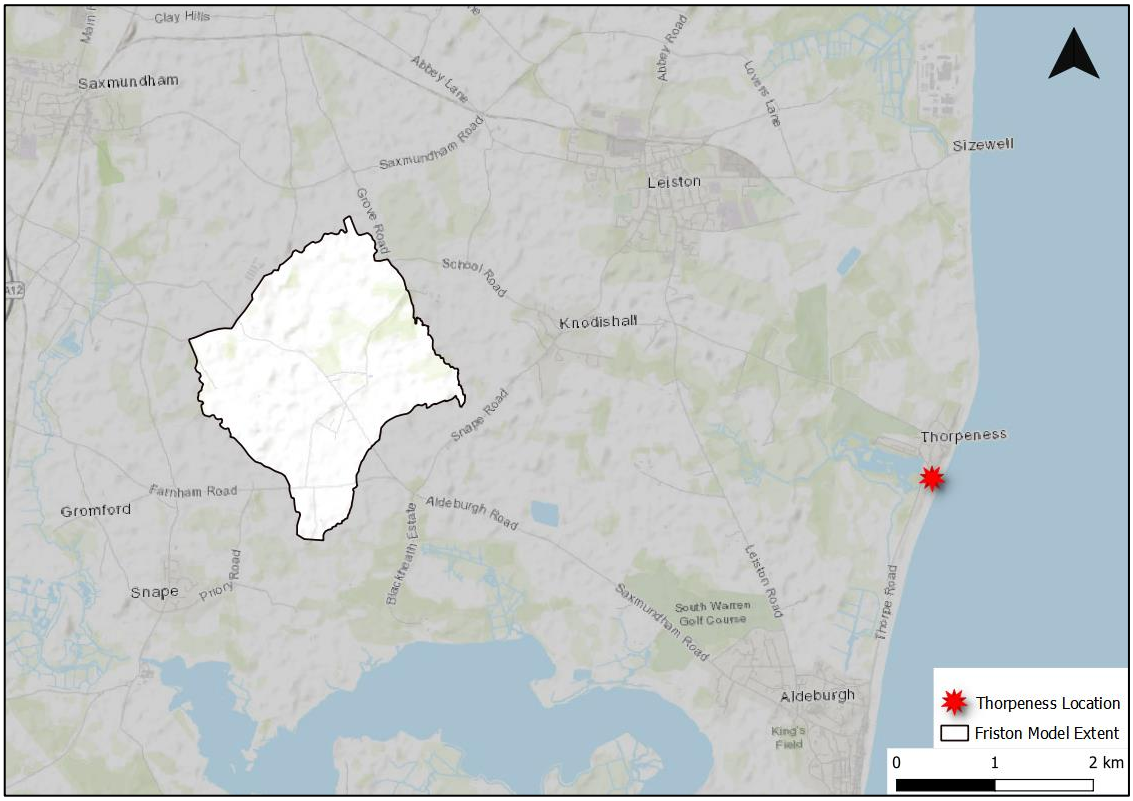

Figure 2-3 - Thorpeness Rainfall Gauge Location

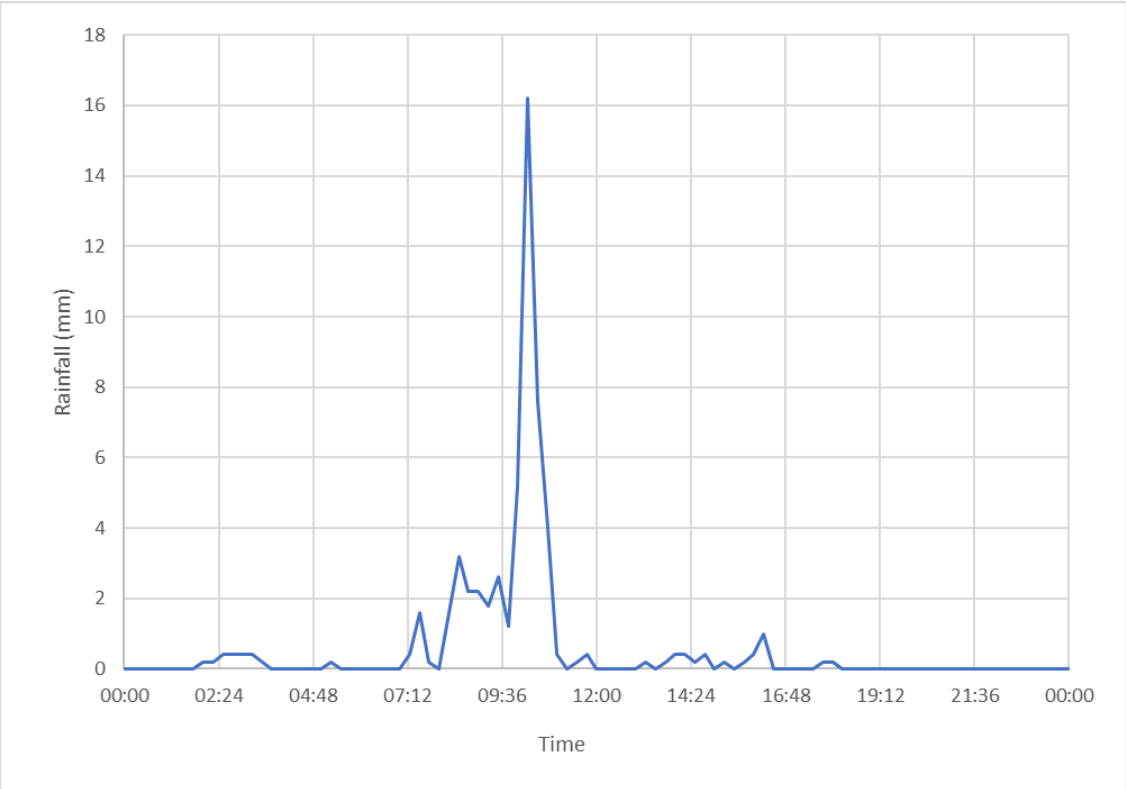

Figure 2-4 - Rainfall recorded on the 6th of October 2019 at Thorpeness rainfall gauge

The detailed topographic survey undertaken in November and December 2019 documented the location of wall elevations, kerbs, road gullies and culverts. These can all affect the flow paths of surface water flooding and were subsequently include in the model. , BMT were able to represent fine detail within the model including walls and fences (Figure 2-5). By using the topographic survey data (Figure 2-6) and the photographs of observed flooding (Figure 2-2), BMT were able to

establish close to reality environmental conditions in Friston. This included the volume and roughness of vegetation, the runoff routing across Saxmundham Road, and the flow paths which runoff surrounding fields to Grove Road and Aldeburgh Road.

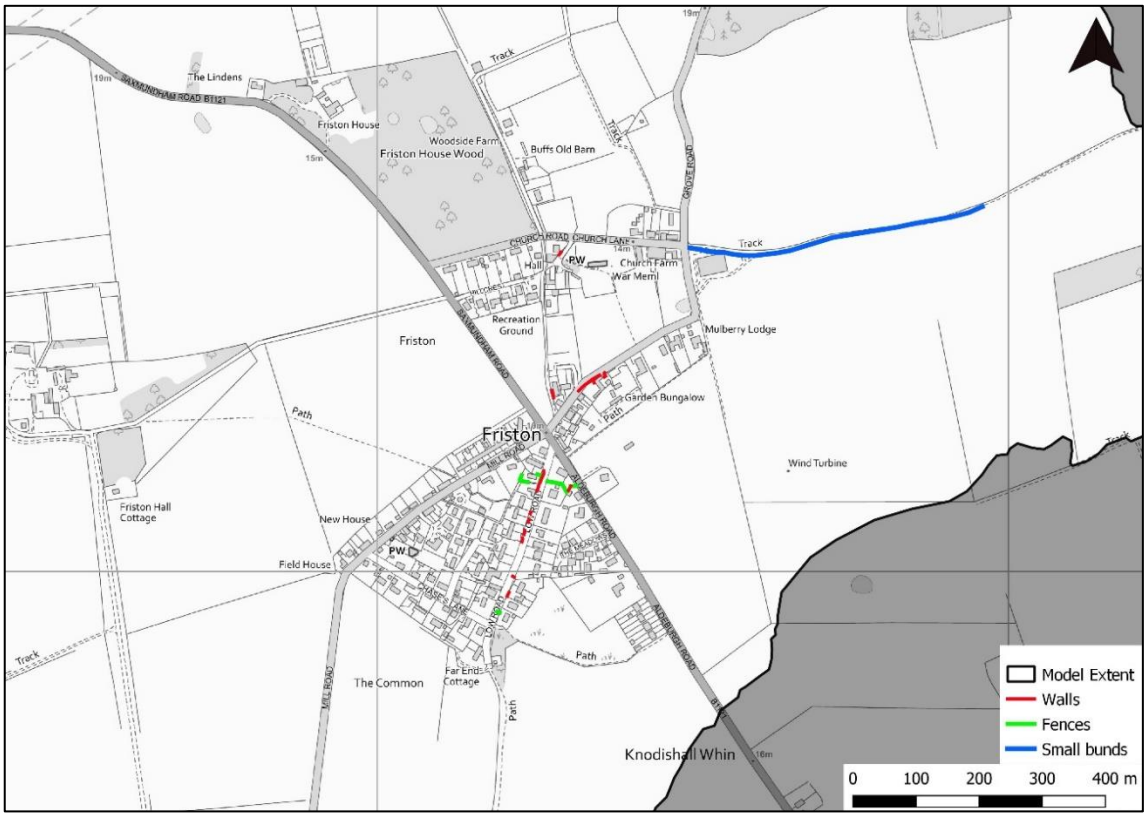

Figure 2-5 - Locations of walls and fences

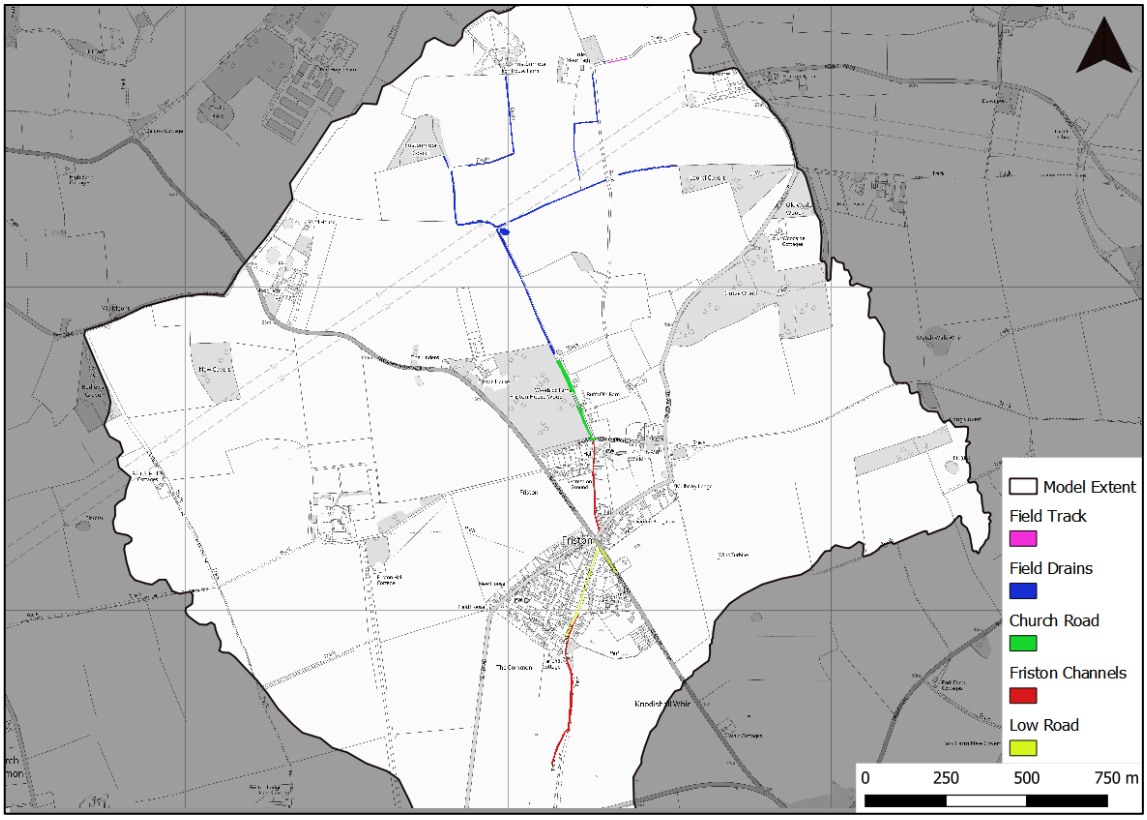

Figure 2-6 - Survey Locations

3 Model Results

3.1 Predicted Flow Routes

The baseline flood model accurately predicted the flood flow paths within the village along Grove Road, Aldeburgh Road, Low Road and Saxmundham Road. These have been confirmed using photographs of previous flood events and anecdotal evidence provided by SCC and local residents. The four key flood flow paths which contribute to the runoff observed within the village have been identified on Figure 3-1 below.

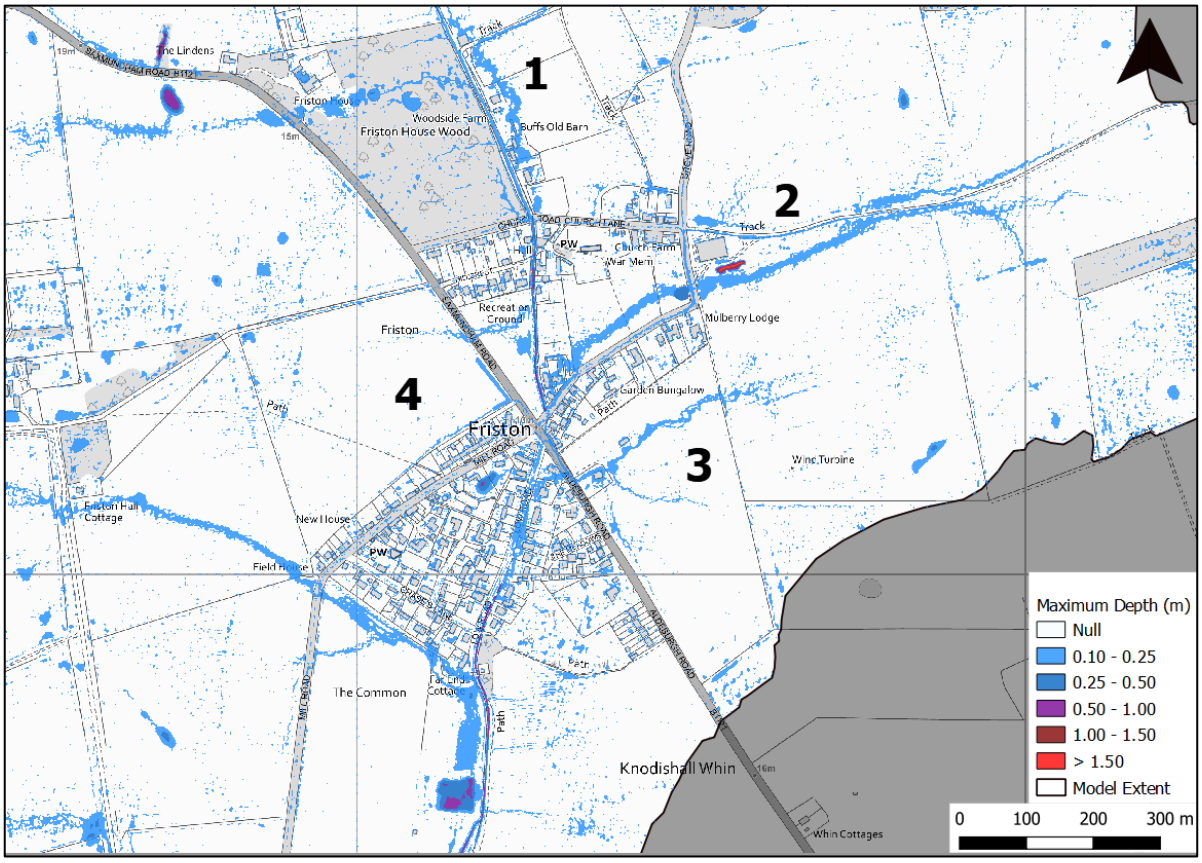

Figure 3-1 - Key Flow Paths in Friston (Baseline 1% AEP Rainfall Event)

3.2 6th October 2019

The four key areas identified above have been carried forward for further analysis, and to help inform the development and assessment of benefit for outline mitigation measures.

To help confirm the ability of the model to accurately predict flood risk in Friston, the 6th of October 2019 rainfall event was assessed using the model.

The results of the 6th October 2019 event have been compared to photographs and anecdotal evidence provided from Suffolk County Council. The flood event was well documented with the majority of photographs considered to have been taken relatively close to the peak of the flood event. The analysis considered the timestamps on many of the photo's compared with the predicted peak of the flooding in the modelled validation event. The depth results with photographs of the event are shown in (Figure 2-4).

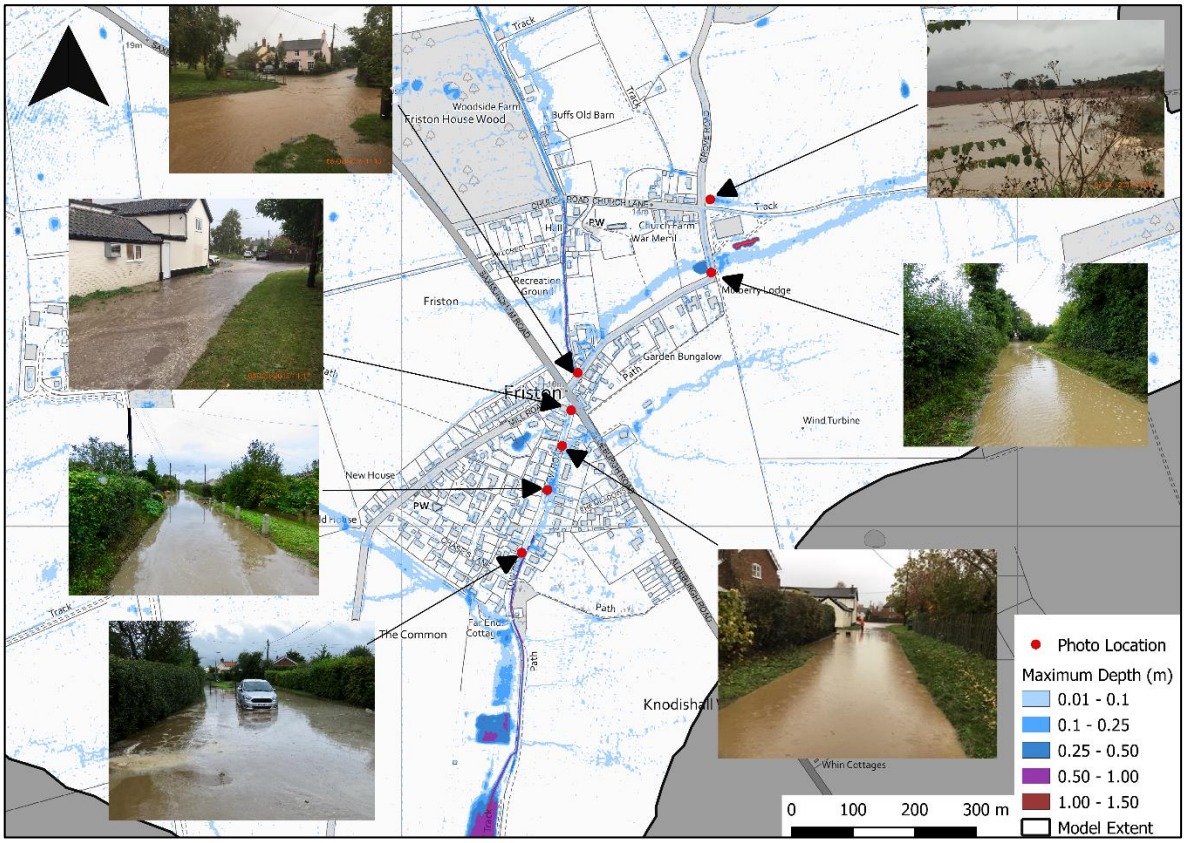

Figure 3-2 - Predicted Maximum Depths of the 6th of October 2019 Event

3.3 Do Nothing (Blocked) Scenario

A 'Do Nothing' scenario was analysed as part of this study. This allowed Suffolk County Council to determine the impact of not maintaining waterways and road gullies to flooding in Friston. The changes made to the model to represent the ceasing of all maintenance were as follows:

- 50% blockage of channel structures to represent structures becoming blocked with debris.
- Road Gullies considered 100% blocked.
- 50% increase in watercourse channel roughness to represent the channel becoming increasingly vegetated and therefore restricting conveyance flow.

A comparison of predicted Do-Nothing flood depths to the Existing flood results is shown in Figure 3-3

Figure 3-3 - Baseline Scenario Vs Do-Nothing, 1% AEP Rainfall Event.

The results indicate that small increases in flood depths would be expected throughout the village in the order of 50 to 100mm, with some larger depths expected in low lying spots between Low Road and Mill Road. This is a useful check to undertake as it can highlight the importance of regular maintenance of the local drainage network.

4 Flood Prevention Measures

Two flood prevention measures have been designed at tested in the Friston hydraulic model.

4.1 Flood Prevention Measure 1

Bunds have been added on the key flow routes identified and are designed to be a sufficient height and width to capture all surface water flow (Figure 4-1). The results of the modelling show a significant amount of ponding water behind the added bunds. The results show the application of the bunds has reduced the amount of water in the flow route which follows Grove Road to Friston. The two bunds in the field east of Aldeburgh Road are predicted to collect a significant amount of water in the 1% AEP flood event. This reduces the amount of water in the flow path across Aldeburgh Road to Low Road.

Figure 4-1 - Flood Prevention Measure 1, Depth Difference 1% AEP Event

4.2 Flood Prevention Measure 2

The mitigation option consists of two bunds within the field positioned to capture the two identified flow routes which flow west towards Friston (Figure 4-2).The bunds have been implemented within the model with sufficient height and width to capture all of the water in these flow paths for every modelled return event. The results show there is a reduction in the amount of flow crossing Aldeburgh Road to Low Road as a result of the implementation of the bunds in the model. This is causing a reduction in the predicted flood depths on Low Road.

Figure 4-2 - Flood Prevention Measure 2, Depth Difference 1% AEP Rainfall Event

5 Conclusion

Suffolk County Council (SCC) commissioned BMT to help to understand surface water flood risk in Friston.

A flood model has been created for the Friston catchment to assess flood flow routes in the area. The model was run with rainfall from the Thorpeness rainfall gauge for the 6th of October 2019 event. The results showed a good calibration between the hydraulic model and the anecdotal evidence of flooding within the village, this indicates a high degree of confidence in the model.

Two potential mitigation schemes have been modelled in the catchment to attempt to reduce the impact of surface water flooding within the village. The results of both of these measures were shown to reduce flooding in Friston. It is BMT's recommendation to further investigate the potential implementation of these schemes in the future.