

TECHNICAL NOTE

JBA Project Code	2017s6789
Contract	Update to Walsall Flood Risk Data
Client	Walsall Council
Day, Date and Time	October 2017
Author	David Kearney
Subject	Update to Flood Risk Datasets



1 Introduction

In 2013 Walsall Council commissioned JBA Consulting to undertake an assessment of flood risk within Walsall Council's boundaries. This included an assessment of flood risk:

- along ordinary watercourses which were not modelled as part of the Environment Agency's Flood Zone study in 2004;
- from culverts and trash screens identified by Walsall Council; and
- from canal breach.

To assess the flood risk from watercourses, culverts and canals, hydraulic modelling was carried out using 2D modelling techniques in the JFlow modelling platform. Using 2D modelling techniques requires an assessment of channel (or culvert) capacity to be made, flow up to this threshold is removed from the model inflow hydrograph, with excess flow being routed across a DTM to understand flood risk. As part of the 2013 commission, several culvert locations were visited to gather information on the dimensions of the structures and allow an assessment of the capacity to be made. Where lengths of watercourses were modelled, the scope of the study did not allow for a detailed assessment of channel capacity to be made, therefore a capacity equal to the 2-year flow was assumed at all locations.

Walsall Council have requested that the flood risk datasets developed as part of the 2013 study are updated around Highfields South Landfill Site due to new data being available, including:

- New topographic data of the site;
- New survey of the culvert under Boatmans Lane / Daw End Canal

2 Data

In October 2017 Walsall Council provided revised ground elevations to be used in the hydraulic modelling. These were noted in the files:

- HSQ068 Council SAD Flood Zones original - digitised on July 2017 survey - to council.dwg (ground levels at July 2017)
- HSQ067 Flood Zones on Post Rest to council.dwg (proposed post restoration ground levels)

Additionally, Boatmans Lane Drainage Report.pdf authored by Young Technical Services was provided which outlined a constriction on the culvert flowing towards the site under Boatmans Lane. The report noted that the smallest diameter culvert at this location was a 600mm diameter pipe, which was heavily compromised by root growth. No information on the proportion of the culvert blocked was available, therefore this study has assumed a 50% blockage of the asset.

3 Approach

The JFlow models developed in 2013 were amended with regards to ground levels and culvert capacity at Boatmans Lane and under Walsall Road, as noted in the following sections.

3.1 Assessment of culvert capacity

The capacity of the culvert under Boatmans Lane was assumed to be 0.255m³/s in the 2013 study. It has been estimated using Manning's equation for the update to the flood risk datasets and the capacity has been shown to reduce to approximately 0.1m³/s.

The capacity of the culvert under Walsall Road to be 0.168m³/s with a peak flow of 6.518m³/s in the 100-year event in the 2013 study. No revised information on culvert geometry was available for this study, however it was noted the culvert was impeded. The capacity has therefore been reduced to 0.1m³/s.

3.2 Model inflows

No changes have been made to the model inflows estimated in 2013.

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3.3 Ground model

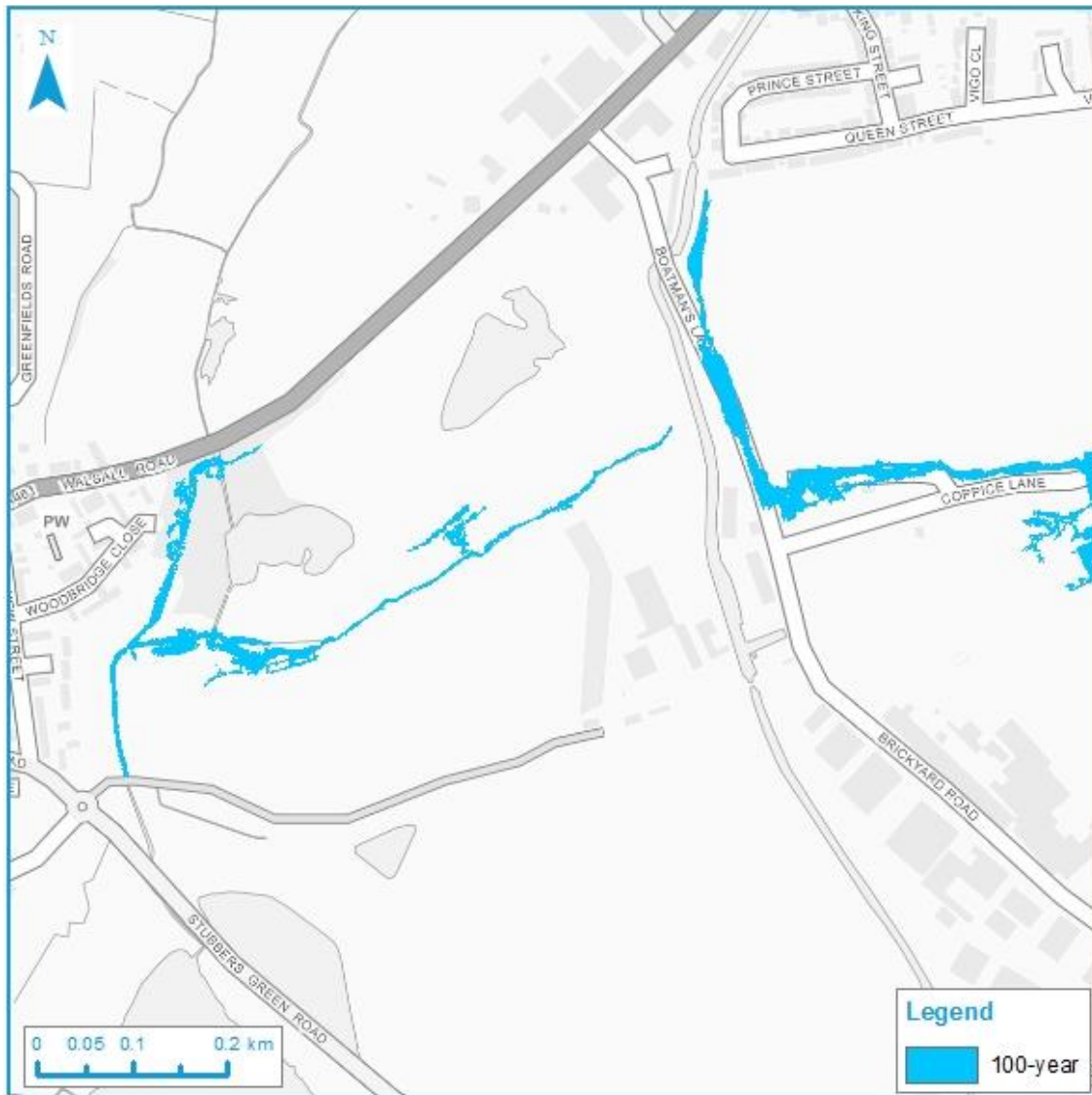
The contour data provided in AutoCAD format by Walsall Council was used to create DTMs within ArcGIS for the Highfields South Landfill Site for the current ground levels (July 2017) and the proposed post restoration ground levels. These were spliced into the existing DTM used for the 2013 model, no other changes were made to the DTM.

4 Results

4.1 Current ground levels

The revised hydraulic modelling shows a reduced flood extent through the site for the 100-year flood event, as shown in Figures 1. Flood extents along Boatmans Lane are slightly increased due to the reduction in culvert capacity in the model at this location. Flood extents to the north of Walsall Road show only negligible differences and are not shown on Figure 1. South of Walsall Road, Figure 1 shows the flood risk associated with water backing up from the confluence area adjacent to Woodbridge Close.

Figure 1: 100-year flood extents at Highfields South Landfill Site



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4.2 Proposed post restoration ground levels

The site is currently being restored therefore Walsall Council require that the modelling study incorporates the effects of the changing topography on the site with regards flood risk. The revised hydraulic modelling shows a reduced flood extent through the site for the 100 and 1000-year flood events, as shown in Figures 2 and 3 for the proposed post restoration ground levels. Flood risk to the north of Walsall Road is again not shown, allowing consistency with Figure 1. Flood extents along Boatmans Lane are slightly increased due to the reduction in culvert capacity in the model at this location.

Figure 2: 100-year flood extents at Highfields South Landfill Site (post restoration ground levels)



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Figure 3: 1000-year flood extents at Highfields South Landfill Site (post restoration ground levels)



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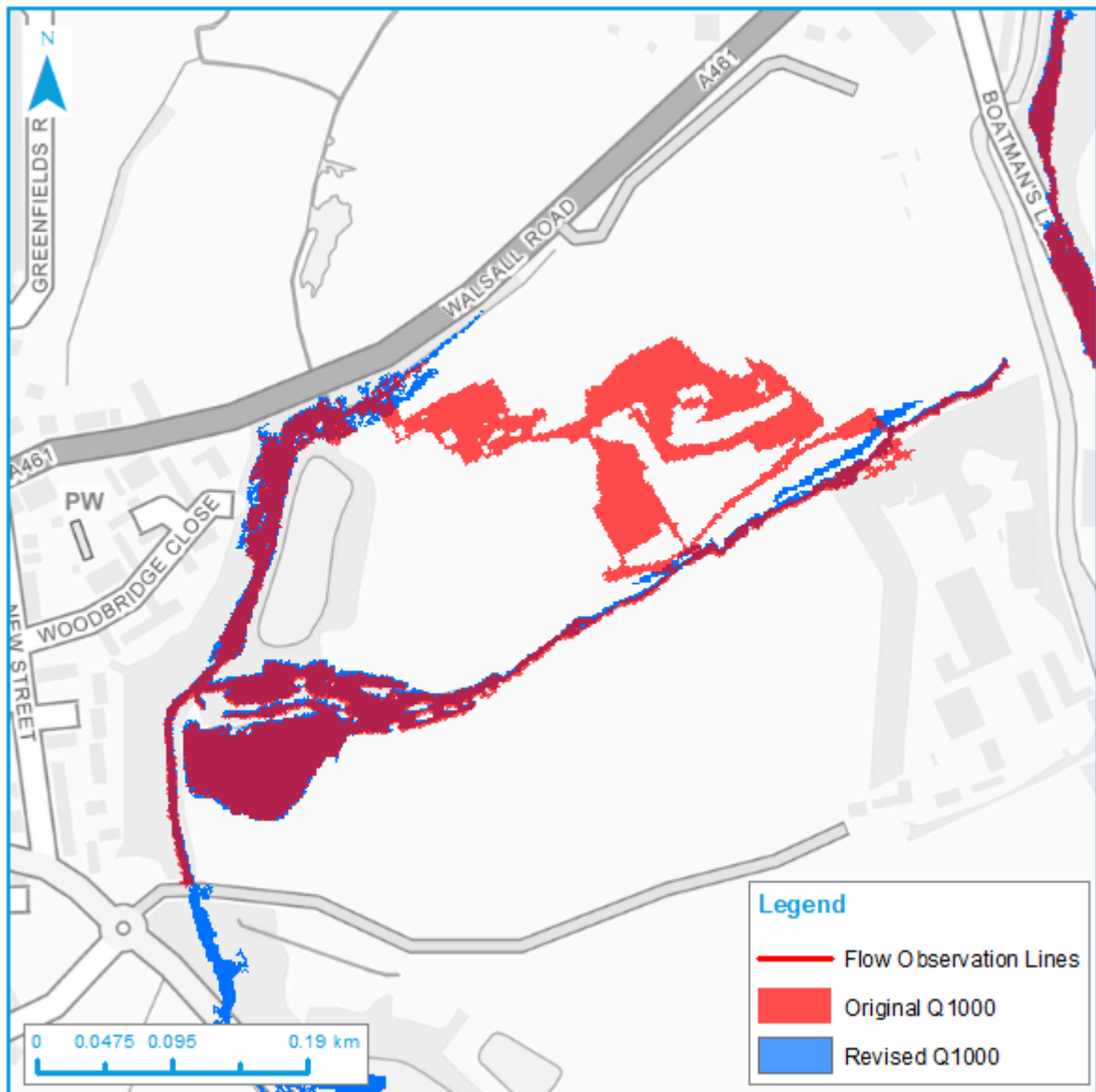
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Figure 4 shows a comparison of the existing 1000-year flood risk extents produced in 2013 and those for the post restoration scenario modelled as part of this commission. It shows some minor changes to flood extents as a result of the changing ground levels.

Figure 4: Comparison of existing and post restoration 1,000-year extents



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5 Conclusions

Walsall Councils flood risk datasets adjacent to Highfields South Landfill Site have been remodelled to account for changes to ground elevations occurring as the site is restored. Consistent approaches to flood modelling have been adopted to those followed during the 2013 study when the flood risk datasets were originally produced and no changes to model inflows have occurred.

It is recommended that the revised flood extents derived as part of this study for the proposed post restoration scenario superseded those produced in 2013 for this location and are used as part of Walsall councils evidence base for their Local Plan