Flood Risk Assessment and Drainage Appraisal Revision 02

Dobroyd Mills

Hepworth, Holmfirth

HD9 1AF

Client:	Mr Z Hinchcliffe
Project Address:	Dobroyd Mills, Holmfirth
Project Number:	15271
Date:	07 June 2016

Table of Contents

Appendices

1.0 Introduction

1.1 This report provides an assessment of the flood risk and an appraisal of the proposed drainage of a proposed development at Dobroyd Mills, Hepworth. This report has been produced to support a planning application. It shows that the necessary investigations of flood risk and considerations of the proposed drainage have been carried out.

2.0 References & Standards

2.1 This Flood Risk Assessment has been carried out generally in accordance with:

- National Planning Policy Framework (March 2012)
- National Planning Policy Framework Technical Guidance
- CIRIA Report C624 "Development and flood risk, Guidance for the construction industry" May 2007
- BS8533:2011 "Assessing and managing flood risk in development, Code of Practice"
- Environment Agency "Flood Risk Assessment (FRA) Guidance Note 1"
- CIRIA Report 753 "The SUDS Manual" 2015

3.0 The Site

3.1 A large proportion of the site is developed with existing mill buildings which currently have a variety of uses including a café, a used car dealership, and a fabricator.

3.2 The site is located off Hepworth Road between Hepworth and Jackson Bridge.

3.3 The site is bounded farmers' fields to the North and West, Hepworth Road and residential properties to the East, and grassed fields and a residential estate and church to the South.

3.4 The approximate grid reference of the site is E416383, N407225 and SE 16381 07225.

3.5 A location plan is shown overleaf and a site aerial location plan is included in Appendix A of this report.

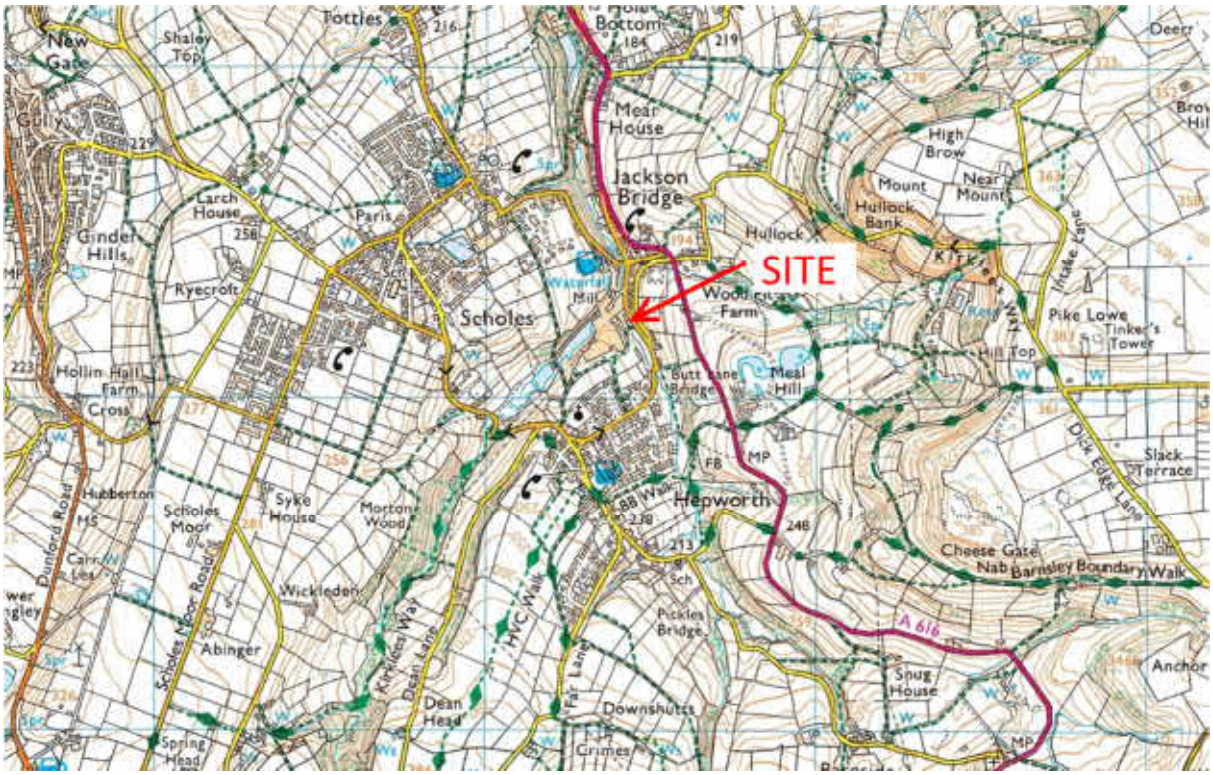


Figure 1: Location plan

3.6 The proposal for the site is to construct a development of residential dwelling houses with associated highways, parking, and landscaping, and the conversion of some of the existing mill into commercial space. A topographical survey drawing is included in Appendix B of this report.

3.7 An assessment of the topography of the site shows that as existing the site slopes down from west to east.

3.8 The total area of the site is approximately 5.0 hectares.

4.0 Sources of Flooding and Flood Risk

4.1 Flooding from Rivers and Watercourses (Fluvial Flooding)

4.2 A fluvial flood map of the area has been obtained, as shown below.

4.3 The flood map shows that the site is predominantly in Flood Zone 1, very low probability, and has an annual probability of fluvial flooding of less than 1 in 1000 (<0.1%).

4.4 A relatively small area of the site closest to the existing watercourses is in Flood Zone 3, and has an annual probability of fluvial flooding of greater than 1 in 100 (>1%).

4.5 Flooding from rivers and watercourses is considered very low for the majority of the site and high risk for a relatively small area of the site at the bottom of the slope.

4.6 Flood Level Data has been obtained from the Environment Agency and is discussed in chapter 5.0.

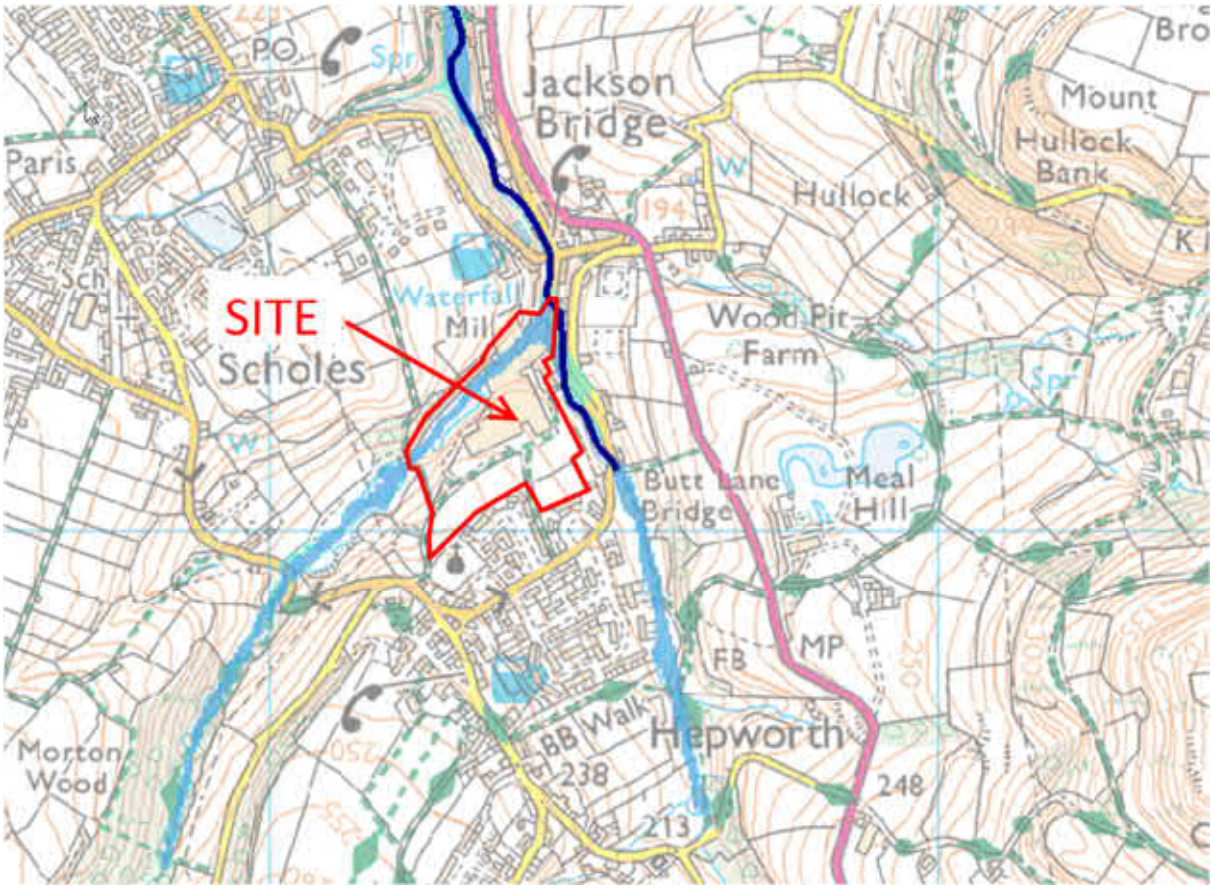


Figure 2: Flooding from rivers

4.7 **Flooding from Land (Pluvial Flooding)**

4.8 A surface water flood map of the area has been obtained, as shown below.

4.9 The flood map shows that the majority of the site has a very low risk of surface water flooding, and has an annual probability of pluvial flooding of less than 1 in 1000 (0.1%).

4.10 A relatively small area of the site closest to the existing watercourses has a high risk of surface water flooding, and has an annual probability of pluvial flooding of greater than 1 in 30 (3.3%).

4.11 The finished floor levels of the proposed buildings will be set higher than the surrounding land, roads and parking areas, and the ground will be designed to fall away from any proposed buildings.

4.12 Flooding from land is considered very low for the majority of the site and high risk for a relatively small area of the site at the bottom of the slope.

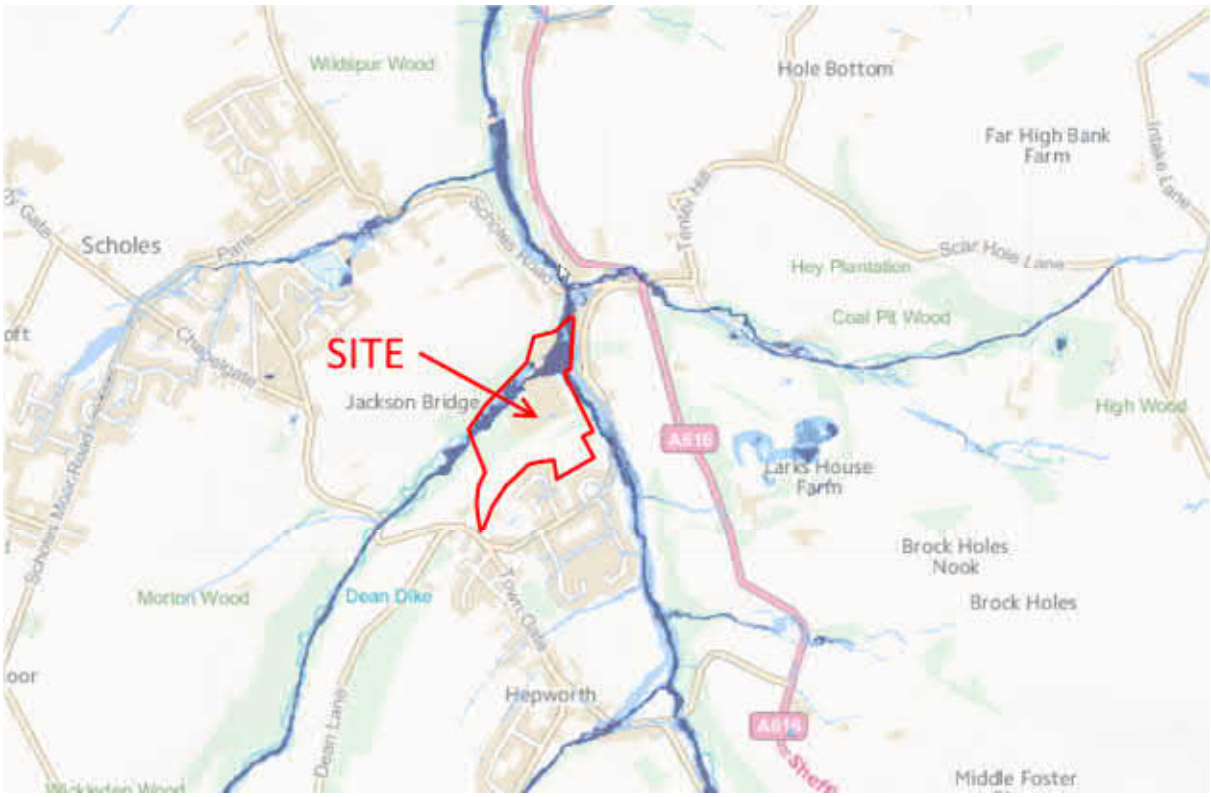


Figure 3: Flooding from land

4.13 Flooding from Groundwater

4.14 Groundwater flooding occurs when water levels in the ground rise above surface levels, and is more likely to occur in low lying areas. Any rainfall on the site will naturally drain towards the eastern boundary of the site.

4.15 The finished floor levels of the proposed buildings will be set higher than the surrounding land, roads and parking areas, and the ground will be designed to fall away from any proposed buildings.

4.16 Flooding from ground water is considered low risk.

4.17 Flooding from Sewers

4.18 Flooding due to lack of capacity of the public sewerage system in the event of heavy rain also needs to be taken into account. Any surcharge from the existing or proposed drainage network will follow the same path as explained in section 4.14.

4.19 Flooding from sewers is considered low risk.

5.0 Environment Agency Data

5.1 A request for flood level information was sent to the Environment Agency on 4th March 2016.

5.2 The Flood Model Data is contained within Appendix D.

5.3 The 1 in 1000 year flood level at node EA1231239_NEWM01_3932 is 181.058 m A.O.D.

5.4 The 1 in 100 year flood level at node EA1231239_NEWM01_3932 is 179.926 m A.O.D.

5.5 The Flood Model Drawing is contained within Appendix D.

5.6 The proposed buildings will be constructed a minimum of 600mm above the 1 in 100 year flood level, at 180.526 m A.O.D. Where practicable, properties will be set above the 1 in 100 year flood level of 181.058.

5.7 Flooding from Reservoirs

5.8 By studying Environment Agency maps it is understood that the site is predominantly located outside the area of maximum extent of flooding from reservoirs, with a relatively small area adjacent to the existing watercourses within the area of maximum extent.

5.9 Reservoirs are inspected in accordance with the Reservoirs Act 1975; it is not pragmatic to design developments to deal with the results of a reservoir failing due to how unlikely it is to occur and the extent of the resulting flooding.

5.10 Overland flow routes must be considered during the external works design to ensure that flood flows can pass through the site, mitigating risk to people and property in the unlikely event of reservoir flooding.

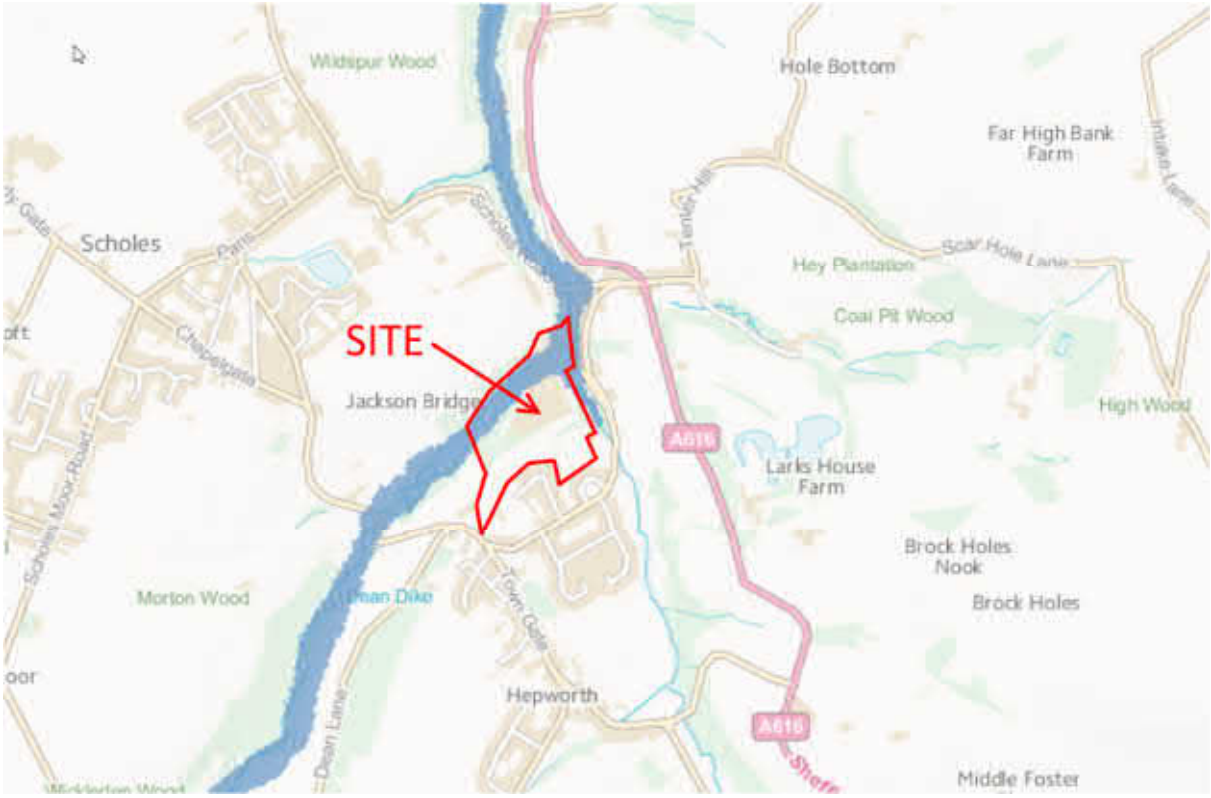


Figure 4: Flooding from reservoirs

6.0 Drainage Appraisal

6.1 Surface water discharge will follow the ground, watercourse, sewer, hierarchy in accordance with the principles laid down in CIRIA Report 753 “The SUDS Manual” 2015.

6.2 Existing drainage connections will be reused where it is practicable, subject to CCTV condition and connectivity surveys.

6.3 Approval for any new drainage connections will be sought from the relevant authorities prior to connections being made.

6.4 The surface water drainage from existing hardstanding areas and roofs will be restricted to 70% of the existing runoff to provide a 30% betterment. Undeveloped areas will be restricted to Greenfield run off. Attenuation storage will be provided on site for the 1 in 100 year storm event plus an allowance for climate change.

6.5 **Surface Water Management Plan**

6.6 British Geological Survey borehole records near to the site indicate that the local area is underlain by clay and mudstone, as shown in Appendix C. Underlying rock can be seen to be outcropping at the higher end of the site.

6.7 The underlying strata means that discharging the surface water to ground is unlikely to be a viable drainage option.

6.8 There are two existing watercourses adjacent to the site.

6.9 The topographical survey indicates that surface water flows currently follow natural topography and outfall to the adjacent watercourses. Therefore it is proposed that surface water flows outfall to watercourse at a controlled rate as per the existing regime.

6.10 In accordance with national guidelines it is the intention to limit surface water flows to the 1 in 1 year rate of discharge from the development prior to redevelopment. Surface water flows will be collected by a dedicated gravity system. The surface water system will accommodate flows on-site up to and including the 1 in 100 year critical duration event, with an allowance for climate change.

6.11 **Foul Water Management Plan**

6.12 Foul water disposal will be into existing adopted combined sewers in Hepworth Road using existing connections where suitable, subject to a CCTV condition and connectivity survey.

7.0 Conclusions

7.1 Flooding from rivers and sea, surface water, ground water, sewers, and reservoirs have been considered.

7.2 Flooding from rivers and watercourses is considered very low for the majority of the site and high risk for a relatively small area of the site immediately adjacent the two streams on the north eastern and north western boundaries.

7.3 Flooding from land is considered very low for the majority of the site and high risk for a relatively small area of the site immediately adjacent the two streams on the north eastern and north western boundaries.

7.4 Flooding from ground water, sewers, and reservoirs are considered to be low risk.

7.5 Proposed new buildings will be located outside the extent of the pluvial and fluvial flooding to reduce the possibility of flooding and prevent flood water from being displaced.

7.6 Surface water discharge will follow the ground, watercourse, sewer, hierarchy in accordance with the principles laid down in CIRIA Report 753 “The SUDS Manual” 2015. Discharge to one of the two watercourses at rates agreed with the Local Authority is the preferred option with attenuation provided on site for the 1 in 100 year storm event plus an allowance for climate change.

7.7 Foul water disposal will be into existing adopted sewers in Hepworth Road using existing connections where suitable, subject to a CCTV survey.

Appendix A

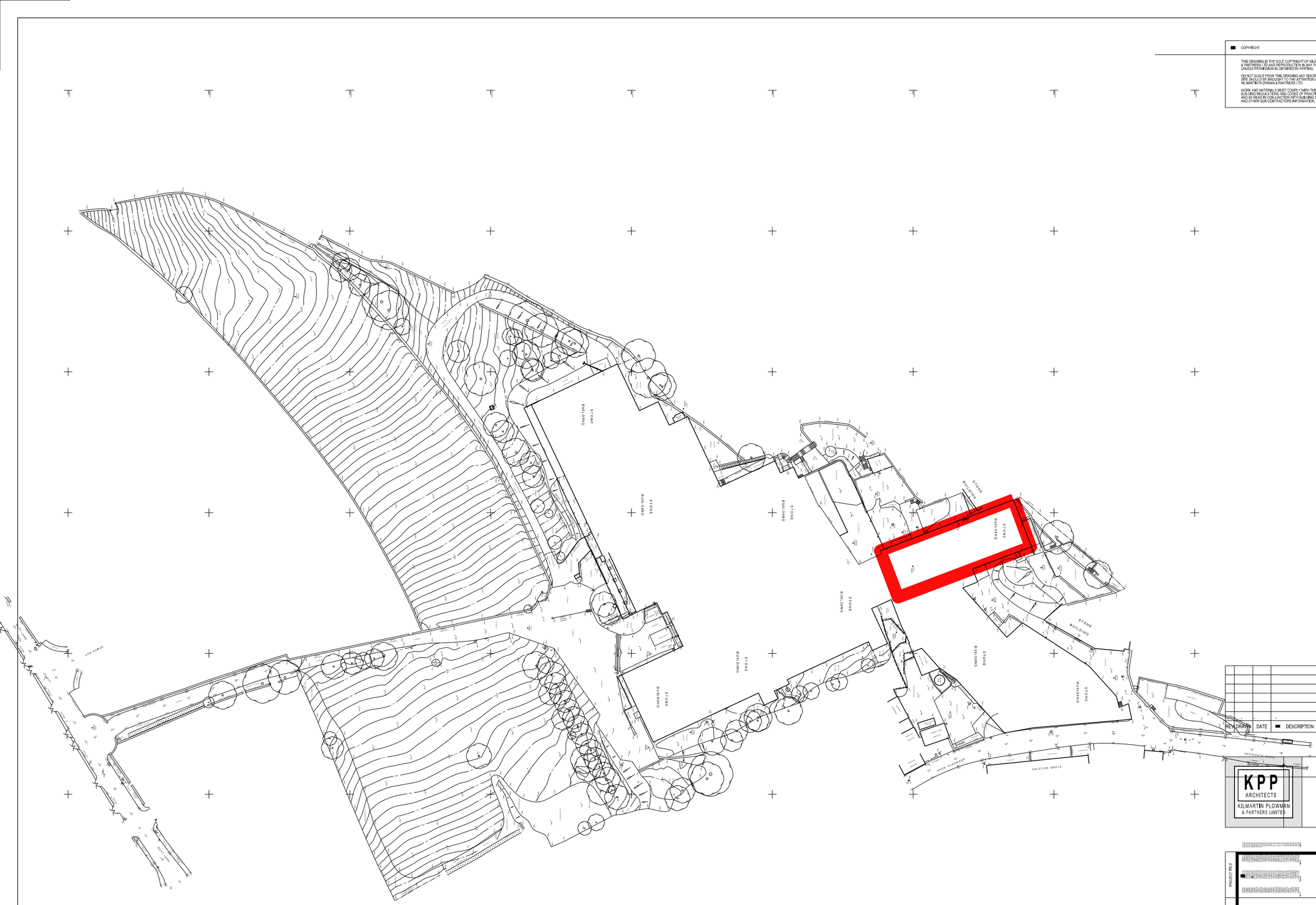
Existing site aerial plan


Hepworth Rd
Chapel Bank
A616
Small Auto
The Oil Can Cafe
The Carding Shed
Hepworth Rd
Butt Ln
Sheffield Rd
Hepworth Cres
Kemps Way
Schlager K H
Hepworth, Holy Trinity
Butt Ln
Carr View Rd

Appendix B

Existing topographical survey

KPP ARCHITECTS
KILMARTIN PLOWMAN & PARTNERS LIMITED



REV	DRAWN	DATE	DESCRIPTION

KPP ARCHITECTS
KILMARTIN PLOWMAN & PARTNERS LIMITED

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W : www.kpp-leeds.co.uk

PROJECT TITLE: -

TITLE: -

STATUS: -	SCALE: 1:1250 @ A3	DRAWN: -	
FILE: P:\PROJECTS2\ -		DATE: -	
PROJECT: -	DRAWING: -	REVISION: -	

Appendix C

BGS location plan and borehole log


White Wells Gardens
Dean Bridge Lane
Hepworth Road
Sheffield Road
A616
Staley Royd L
Kemps Way
Butt Lane
Carr View Road
Mount View Road
Upper Gate
Dean Lane
SE10NE27
SE10NE26
SE10NE29
SE10NE28
Hepworth

LOCATION: BUS TURN ROUND
DEAN BRIDGE LANE/TOWNGATE, HEPWORTH

TRIAL PIT 4

Method Case 580E

Date 10.8.83

Casing

Scale 1:20

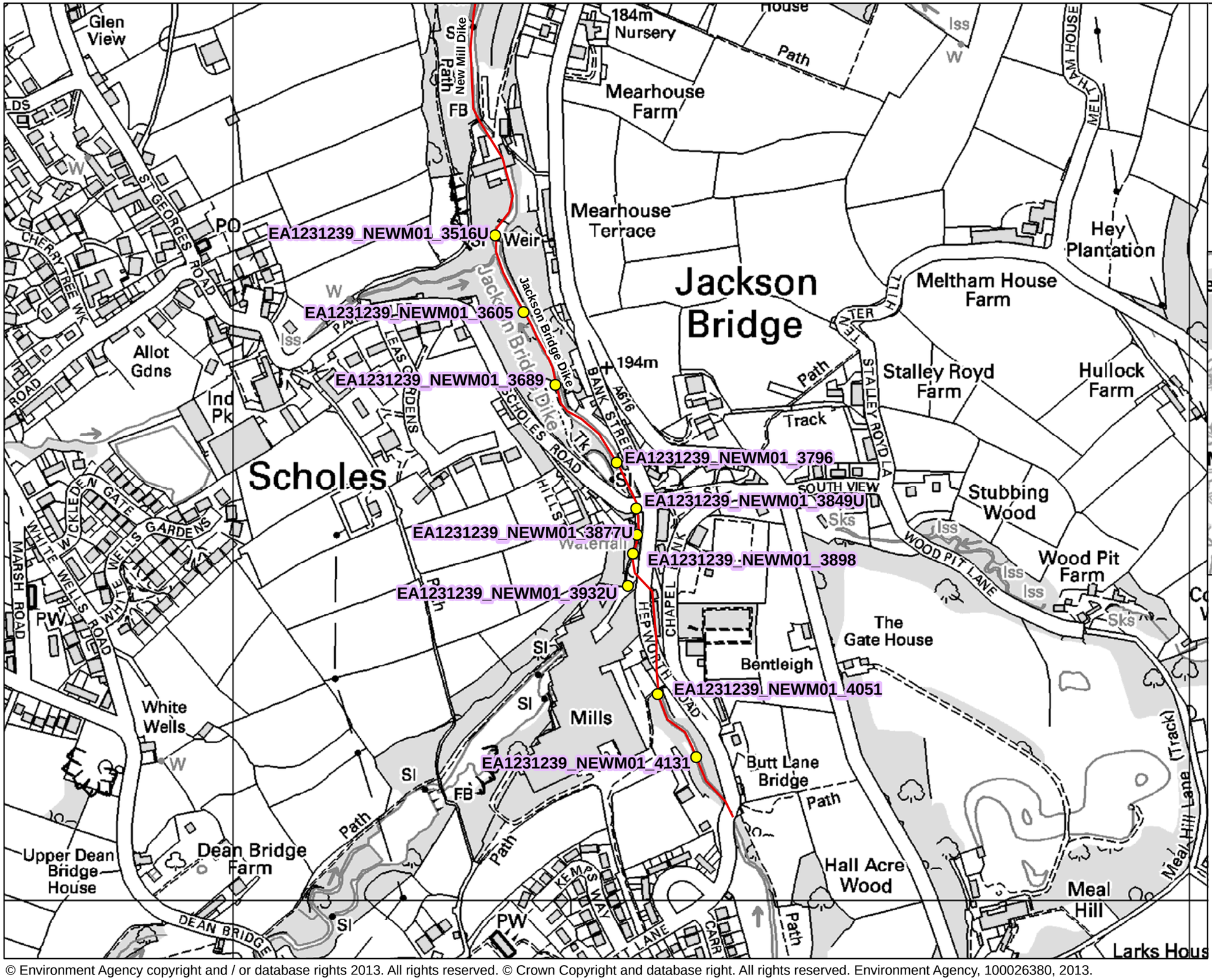
Sheet 1 of 1

R.L. m A.O.D.	DEPTH m	SOIL DESCRIPTION	SAMPLING No.	SAMPLING Depth	TEST	RESULT
221 approx.	G.L.	Measurements taken at highest, S.E. end of pit.				
	0.20	TOPSOIL				
		FILL comprising loose to medium dense brown very silty fine to medium sand with occasional sandstone and gritstone cobbles				
	0.70	coarser sand but very clayey in parts. Broken bricks and dressed stone occur at 1.05m depth. Material is damp.				
	1.30	Firm to stiff mottled brown and grey silty CLAY.				
	1.80	Grey, ironstained brown, silty MUDSTONE with micaceous partings, very weak at top.				
	2.20					
	2.30	siltstone band, moderately strong.				
	2.60	becoming more intact but fissured. Moderately weak becoming stronger at base.				
218 approx.	3.20	End of trial pit Water seepage commenced at 2.60m depth. Filled with water to 2.70m depth within 70 minutes.				

Appendix D

Flood Data and Flood Model Drawing

Node Point Flood Map for Planning, Holmfirth, West Yorkshire16/06/16 RFI: 6561



Environment Agency

www.environment-agency.gov.uk

Scale: 1:4,000

N W E S

when reproduced @ A3

LEGEND

- NodePoints New Mill
- Main River

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Environment Agency - North East Region
Colne and Holme Flood Mapping Study
ISIS Hydraulic Model Summary Sheet

Location Plan

Cross Section References

River: NEW MILL DIKE

Reach: 01

Chainage: 3932

Section Type: CONDUIT, SECTION, SPILL

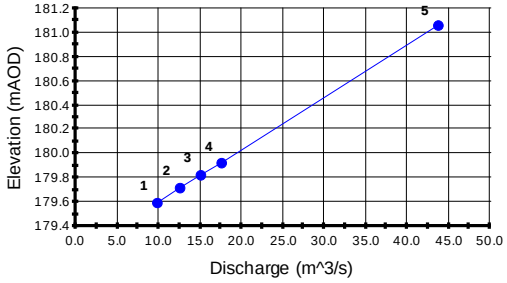
OS NGR: SE 16412 07328

Survey Dwg Ref: N/A

Photograph Ref: NEWM01_3932.JPG

Next
Section d/s: 3898
Section u/s: 3935

Rating Curve



Number represents model profile number

Summary of Results

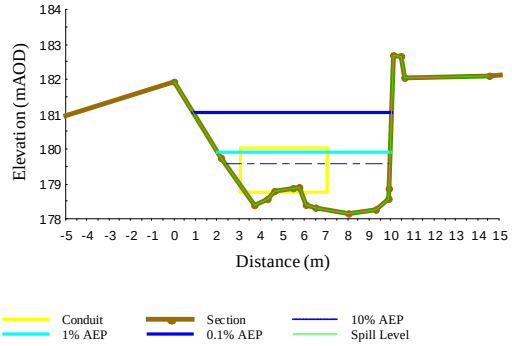
Profile No	AEP (%)	Flow (m^3/s)	Water Level (mAOD)	Velocity (m/s)
1	10.0	9.9	179.598	1.26
2	4.0	12.6	179.721	1.44
3	2.0	15.1	179.826	1.57
4	1.0	17.6	179.926	1.69
5	0.1	43.7	181.058	1.93

Level of Left Bank 181.934 mAOD

Level of Right Bank 182.690 mAOD

AEP: Annual Exceedance Probability = 1/T, where T = Return Period (Years)

Cross Section Profile

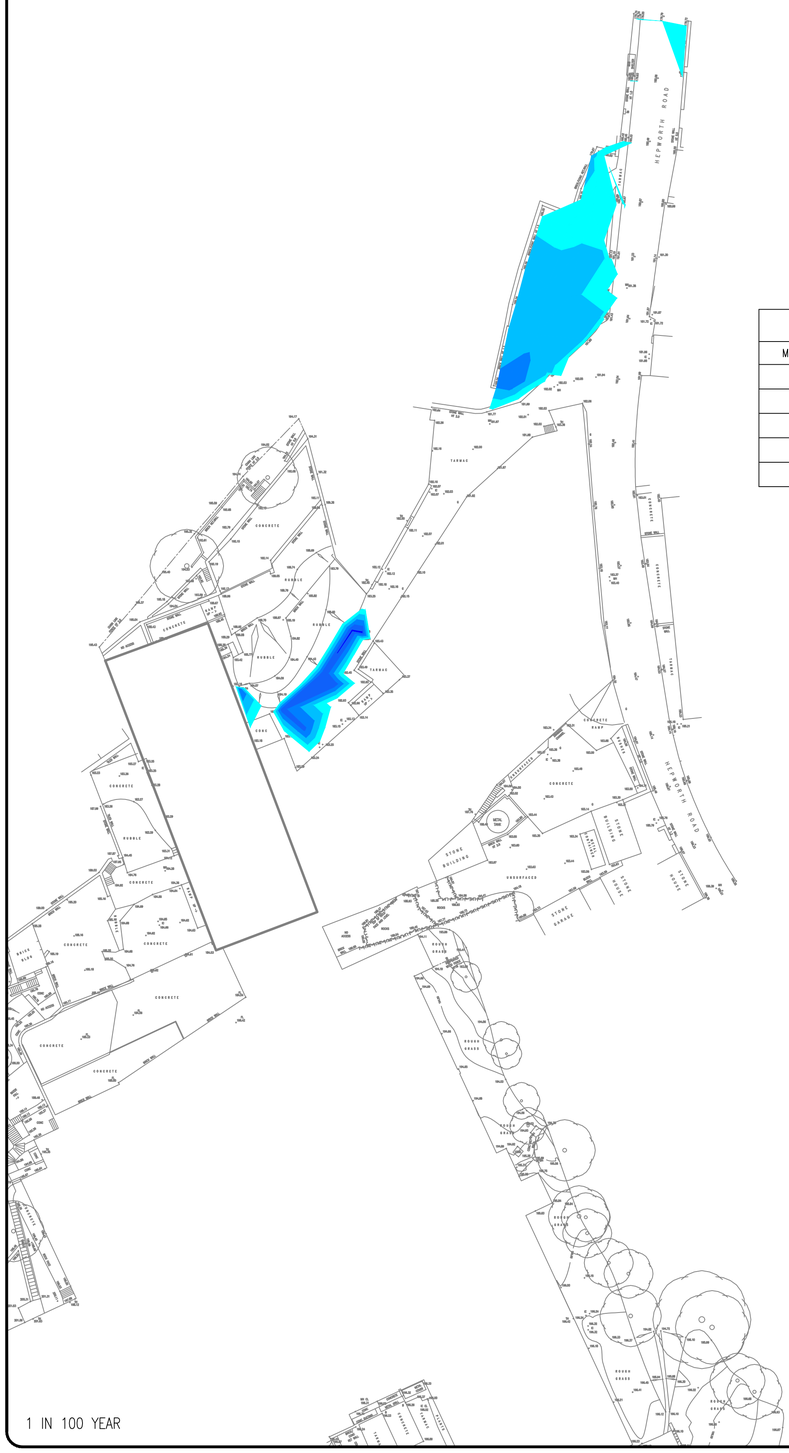


Structure position is indicative only.

NEW MILL DIKE: 01: CROSS SECTION NUMBER 3932u

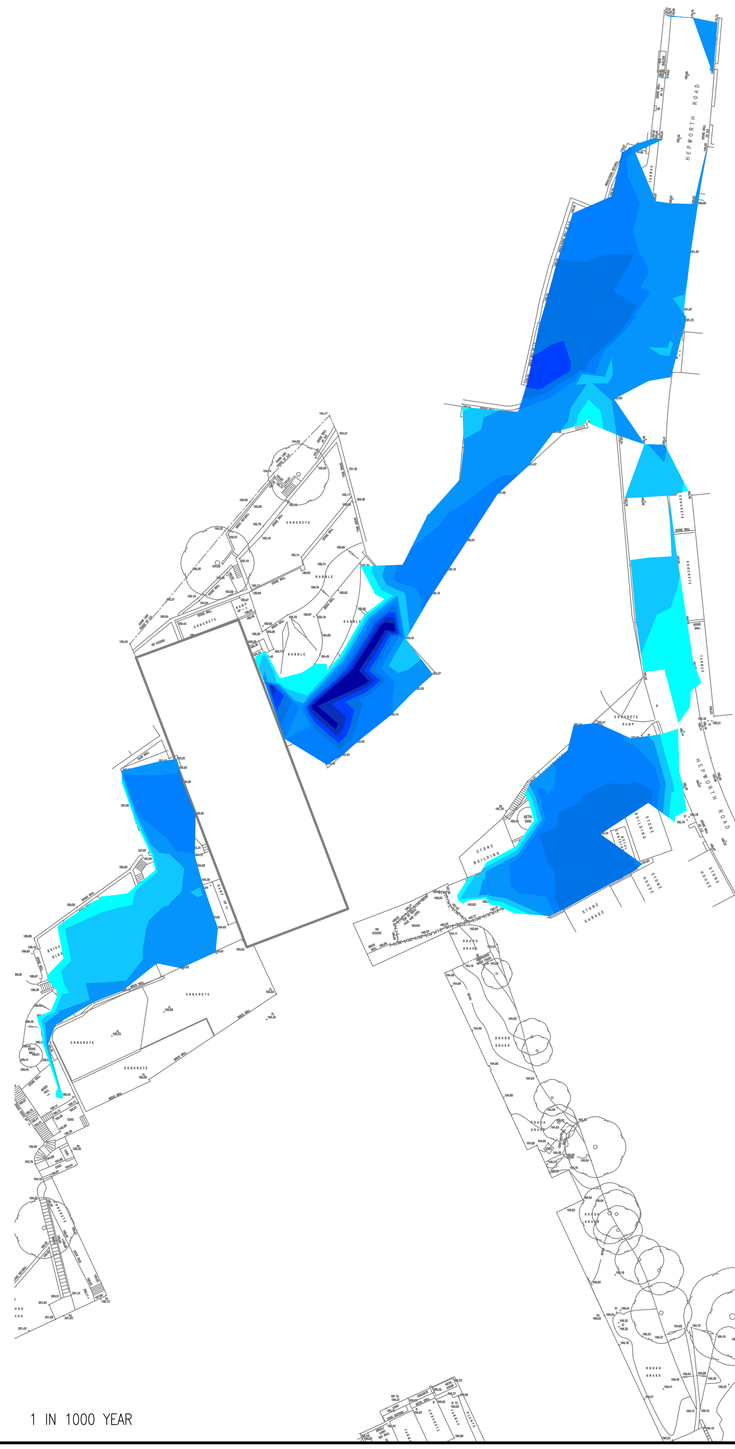
Print Date: 30/03/2006

Do Not Scale



1 IN 100 YEAR

1 IN 100 YEAR FLOOD DEPTH KEY			
MIN DEPTH	MAX DEPTH	AREA	COLOUR
0.00	0.50	217.08	
0.50	1.00	285.86	
1.00	1.50	54.87	
1.50	2.00	31.48	
2.00	2.50	0.59	



1 IN 1000 YEAR

1 IN 1000 YEAR FLOOD DEPTH KEY			
MIN DEPTH	MAX DEPTH	AREA	COLOUR
0.00	0.50	265.94	
0.50	1.00	505.09	
1.00	1.50	878.48	
1.50	2.00	692.95	
2.00	2.50	452.06	
2.50	3.00	73.74	
3.00	3.50	34.39	
3.50	4.00	31.34	
4.00	4.50	0.00	

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS DRAWING HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

Notes

1. THIS DRAWING IS BASED UPON ELLAM LAND SURVEYS TOPOGRAPHICAL SURVEY DRAWING NO. 7009/1 AND ENVIRONMENT AGENCY NODE POINT FLOOD MAP PRODUCED 16.06.16 AND ASSOCIATED HYDRAULIC MODEL DATA.
2. THE I IN 1000 YEAR FLOOD LEVEL AT NODE EA1231239_NEWM01_3932 IS 181.058 m A.O.D.
3. THE 1 IN 100 YEAR FLOOD LEVEL IAT NODE EA1231239_NEWM01_3932 S 179.926 M A.O.D.

Date	Revision	By	Chkd	Ref
04.11.16	PRELIMINARY ISSUE	KB	VB	P2
27.07.16	PRELIMINARY ISSUE	VB	PH	P1

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A1 v.1:1

Project
DOBROYD MILL
HUDDERSFIELD

Title
FLOOD MODEL DRAWING

Scale	1:250	Drawn	KB	Checked	VB
Date	JUL '16	Status	PRELIMINARY		
Drg. No.	15271/001			Rev.	P2