FLOOD RISK ASSESSMENT REPORT

ON LAND OFF

LEE LANE
ROYSTON

ON BEHALF OF

BDW YORKSHIRE WEST

NOVEMBER 2016

Report No: 1048/88r1	Name	Signature	Date
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C O N T E N T S

1.0 INTRODUCTION

1.1 BDW Yorkshire West are considering developing a greenfield site located off Lee Lane, Royston for new residential dwellings. As part of the appraisal and to supplement a planning application, a Flood Risk Assessment Report was required.

1.2 It is within the general development strategy of the country for development in areas where there is a risk of flooding to be assessed to avoid unnecessary increase in the requirement for flood defence. Under the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG), consultation is required with the Environment Agency, Land Drainage Authority and Water Authority and a Flood Risk Assessment Report should be prepared considering the development proposals and make recommendations for any flood mitigation measures.

1.3 ARP Associates have been appointed to carry out an assessment of the site, implement appropriate consultations and prepare a Flood Risk Assessment Report, in accordance with NPPF, to satisfy the requirements of the Planning Authority.

1.4 The consultations and walkover survey have been undertaken between October and November 2016.

1.5 The report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.

2.0 WALKOVER SURVEY

General

2.1 The site is basically a rectangular area of land equating to an area of approximately 5.6ha and is situated on the western edge of Royston village. The Ordnance Survey Grid Reference is SE 349 114.

2.2 A site location plan is presented in Appendix A.

Current Use

2.3 The site is currently a greenfield and used for arable purposes.

Boundaries

2.4 The northern and southern boundaries are formed by a timber post and rail fence with arable/agricultural fields to the west and horse riding stables to the north. The southern boundary is formed by a fence and hedge with a grass verge and Lee Lane beyond. The majority of the eastern boundary is formed by various fences, hedges and walls to rear gardens of properties on Applehaigh View.

Topography and Vegetation

2.5 The site is relatively flat with a perceived fall from west to east towards a culverted watercourse on the eastern boundary. The culvert outfalls into a traditional open channel in the northeastern corner. A topographical survey is presented in Appendix B.

2.6 There are no trees or vegetation in the main part of the site, although some hedgerows and trees are present on the boundaries.

Drainage

2.7 There is no positive drainage system on the site, although land drainage may be present. It is clear that overland water will run to the watercourse in the northern corner.

2.8 In order to assess the existing drainage and possible outfall points, an investigation of the existing drainage system was undertaken by Jet Aire Drain Care Ltd, under instruction of ARP Associates on the 2nd November 2016. A copy of the Jet Aire Drain Care Ltd Report is presented in Appendix C.

2.9 The investigation identified a 750mm diameter culvert running from a manhole in the verge to Lee Lane, along the eastern boundary to a manhole adjacent to Applehaigh View before continuing to an open section of the watercourse in the northeastern corner of the site. This culverted watercourse was seen to be receiving surface water from the Applehaigh estate to the east of the development and possibly surface water in a land drainage system from the field.

2.10 The open watercourse to the northeast was seen to have a significant amount of silt in the bottom of the pipe and it will be necessary for this to be flushed out and cleaned for any future development.

3.0 ENVIRONMENT AGENCY CONSULTATION

3.1 A consultation was requested from the Environment Agency and a copy of their response, reference RFI/2016/24990 dated 18th October 2016 is presented in Appendix D for reference.

3.2 The Environment Agency Flood Map shows that the site falls within an area which has less than a 1 in 1000 (0.1%) chance of flooding in any year.

3.3 The Environment Agency has no known flood history for the site, but flooding in the locality did occur in June 2007. Whilst this confirms that there was no flooding on the site at this date, the Environment Agency has stated that some information may be missing and, therefore, the information should be viewed as a draft output.

3.4 There are no flood defences in the vicinity and there is no flood modelling information at this location. This is because the watercourse forming the eastern boundary is not a designated main river and is classed as an ordinary watercourse. Therefore, the Environment Agency does not have any information available in regard to current flood risk.

3.5 The risk of flooding can come from several sources and the Environment Agency has provided the risk of flooding from surface water maps as part of the consultation. This shows that the site has a high risk of flooding from surface water, greater than a 1 in 30 year flood extent. This will need to be assessed and considered in the design of the site to reduce flood risk.

3.6 Surface water discharge from the new development should ideally "mimic" the pre-development situation, using a sustainable drainage system so that the flow and volume of water in the watercourses in not increased. Guidance should also be sought in respect of climate change from the Environment Agency guidelines.

3.7 The site is not located within a Flood Warning Zone.

4.0 WATER AUTHORITY CONSULTATION

4.1 A consultation was requested from Yorkshire Water, who is the Water Authority for this area, and a copy of the response, dated 14th October 2016 under reference S015357, is presented in Appendix E for reference purposes.

4.2 There is an existing 450mm diameter public surface water sewer within the site. No buildings or other obstructions are to be erected within 3.5m, nor trees planted within 5m of this public sewer. Existing ground levels should not be raised or lowered over the sewer or any access to manholes restricted. The sewer can be diverted under a Section 185 Agreement of the Water Industry Act 1991, subject to an Application in writing. Furthermore, there is an outfall to a watercourse, under the control of Yorkshire Water, located within the site. Vehicular access, including large tankers, could be required at any time, and the development should reflect this requirement.

4.3 Foul water can discharge to the 225mm dimeter public foul sewer recorded in Parkhead Close approximately 40m from the site. It should be noted that this sewer is not shown on the sewer maps, but it has been transferred as a public asset under the private to public sewer transfer. If a sewerage pumping station is required to facilitate the connection, then the discharge must not exceed 5l/s.

4.4 In respect of surface water, the local public sewer network does not have capacity to accept any surface water disposal from the site. Reference is made to requirement H3 of Building Regulation 2000 and Sustainable Drainage Systems.

4.5 Yorkshire Water have identified that the watercourse located through the site appears to be the obvious place for surface water disposal.

5.0 LAND DRAINAGE AUTHORITY CONSULTATION

5.1 A consultation was requested from Barnsley Metropolitan District Council, who is the Land Drainage Authority for this area, but at the time of writing the report no formal response has been received.

5.2 However, a verbal discussion has been undertaken and the Authority would restrict surface water discharge to 5l/s/ha for greenfield run-off.

5.3 There are watercourses in the vicinity of the site and any discharge would need to ensure that there is no greater run-off into the system than exists at the present time.

6.0 MATERIAL CONSIDERATION IN RESPECT OF NPPF AND PPG

Flood Classification

6.1 The consultation with the Environment Agency has identified that the main area of the site falls within land assessed as having less than a 1 in 1000 annual probability of river or sea flooding in any year (less than 0.1%). In accordance with Table 1 of the PPG, the site falls within Flood Zone 1 "low probability".

6.2 Therefore, all uses of the land are appropriate within this zone, but an assessment of the effect of surface water run-off will need to be incorporated in any Flood Risk Assessment.

End Use

6.3 The development proposal is for the construction of residential dwellings on the site, and a copy of the indicative proposed layout is presented in Appendix F for reference purposes.

6.4 When applying Table 2 of the PPG, the flood risk vulnerability classification shows that the end use will fall into a "more vulnerable" classification.

Sequential Test

6.5 As set out in the NPPF, the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding (Zone 1).

6.6 When the site is evaluated in accordance with Table 3 of the PPG, the development shows that the Sequential Test is satisfied.

Flood Sources

6.7 Flooding from Rivers - There are no rivers maintained by the Environment Agency within the vicinity of the site and the Environment Agency Consultation confirms there is no flooding from this source.

6.8 Flooding from Local Watercourses - There is a culverted watercourse along the eastern boundary which opens out towards the northeastern corner. Whilst there is no historical flooding recorded from the watercourse and flooding is considered to be low risk, the proposed development will need to consider the potential effects of flooding in the event of blockage of the watercourse.

6.9 Flooding from the Sea - The site is not located near enough to the sea to cause a problem of flooding from this source.

6.10 Flooding from Land - The surface water Flood Maps show that, during times of storm, surface water ponds on the site, probably due to impermeable strata at the surface. It will be necessary, therefore, to consider levels on the development to ensure that surface water flooding is controlled as part of the development criteria.

6.11 Flooding from Groundwater - The presence of the watercourse along the eastern boundary and others in the vicinity, together with the noted problem of flooding from surface water run-off, indicates that the surface ground conditions are likely to be impermeable. A Geo-Environmental Site Investigation has been undertaken on the site by Resource and Environmental Consultants Ltd, under reference 4553784P1R0 dated 24th April 2014. The report identified Glacial Till to the west and Glacial Fluvial sands and gravels to the east. Infiltration testing was undertaken as part of the investigation and rates of 1 x 10^{-3}m/s and 1 x 10^{-5}m/s, indicating a medium degree of permeability, were recorded. Furthermore, groundwater levels were encountered at approximately 2m below ground level. Therefore, flooding from groundwater issues may occur in certain conditions and the development will need to address this possible situation.

6.12 Flooding from Sewer - A new drainage system will need to be introduced onto the site, and it is possible that any blockage will result in flooding from the lowest cover level of manholes or gullies. This will need to be considered as part of any proposed development.

6.13 Flooding from Reservoirs, Canals or Artificial Sources - A review of the Environment Agency website shows that there are no reservoirs, canals or artificial sources within the vicinity of the site, and flooding from this source is considered to be low risk.

Climate Change

6.14 The NPPF and TG has indicated that the Global sea level will continue to rise, depending on greenhouse gas emissions, and the sensitivity of the climate system and there will be an increase in rainfall across the country. Climate change parameters were changed in February 2016 with peak river flows expected to increase by up to 50% in certain areas, and an increase of rainfall of up to 40% in land areas.

6.15 The land to the east of the site is a built-up residential area with positive drainage, whilst other boundaries are generally level with the site. Therefore, any run-off from outside the site will be relatively insignificant and, on this basis, only rainfall falling within the site boundaries will need to be considered in respect of climate change.

6.16 In accordance with the revised climate change figures, for an expected life of greater than 50 years for any new development, the anticipated increase in rainfall will be 40% and the drainage system should be designed in accordance with this requirement.

Flood Mitigation

6.17 As the site falls within Flood Zone 1, the Sequential Test is satisfied and there is no flooding anticipated from the local watercourse. However, in the event of a catastrophic storm, blockage of the watercourse or blockage of the proposed drainage system, it would be necessary to consider some precautionary flood mitigation measures, as follows:-

6.17.1 Floor levels to the properties shall be raised above external levels by a minimum of 150mm.

6.17.2 Properties shall be designed without any basements and ground floors shall comprise solid concrete slabs or beam and block with screed construction.

6.17.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from first floor level.

6.17.4 In order to accommodate the potential problem of surface water flooding and groundwater issues, finished levels will need to be raised and designed to ensure there is route for flood water through the site to the watercourse to non-sensitive areas such as Public Open Space to avoid flooding of buildings.

Sustainable Drainage

6.18 In order to comply with the requirements of NPPF, it will be necessary to consider aspects of Sustainable Drainage techniques for the new development. A Geo-Environmental Site Investigation has been undertaken on the site by Resource and Environmental Consultants Ltd, under reference 4553784P1R0 dated 24th April 2014. This identified that Glacial Till was present to the west of the site, whilst Glacial Fluvial sands and gravels were to the east. Infiltration tests were undertaken for the granular deposits over the eastern part of the site and rates of 1×10^{-3}m/s and 1×10^{-5}m/s were recorded indicating a medium degree of permeability. However, as groundwater levels were encountered at approximately 2m below existing ground level, it was considered unlikely that the soakaways would be located above this level on detailed design and would, therefore, be ineffective. Therefore, for the purposes of this report, a positive drainage system will be required with surface water discharge to the watercourse.

Drainage

6.19 It is a requirement to ensure that surface water run-off from any proposed development has negligible consequence on downstream areas either in sewer capacity or discharge to watercourse.

Existing Surface Water Run-Off

6.20 There is no development on the site and it will be necessary to agree a greenfield run-off rate to the watercourse with the Land Drainage Authority. However, verbal confirmation has been received that a rate of 5l/s/ha will be acceptable for a greenfield run-off from the site. The total site area is 5.6ha, but the development area, after removing any Public Open Space and other green areas, is 4.75ha. Therefore, the greenfield run-off from the site will be 23.8l/s.

Proposed Surface Water Drainage

6.21 The proposed development layout is only indicative at this time, and is not sufficient to enable an impermeable area calculation of the proposed development to be made. Therefore, assuming that 50% of the development area is impermeable (2.38ha), indicative calculations have been carried out using the WinDES Source Control Computer Program to assess the likely attenuation. Making an allowance for 40% increase in rainfall for climate change and restricting discharge to no greater than 23.8l/s, on-site storage of 1247.2m³ will need to be provided for a 1 in 100 year storm. This can be achieved by several methods, including oversize pipes, underground tanks or balance ponds. It is noted that the outfall to the watercourse is likely to be relatively shallow in depth and the use of a detention basis for attenuation is advisable provided this can be located within the proposed development area. It this is possible, an off-line detention basin with a surface area of 1914m² at 1m deep with 0.2m freeboard or equivalent, for side slopes of 1 in 6 could accommodate this volume. The indicative calculations are presented in Appendix G for reference, but detailed calculations and proposals will need to be prepared and submitted to the Planning Authority for approval prior to construction.

Watercourse Conditions

6.22 The discharge or surface water to the watercourse will require the introduction of headwalls or work to the watercourse. This will need the consent of the Land Drainage Authority by submitted an Application for "Consent to Work Within the Watercourse".

Foul Drainage

6.23 Yorkshire Water have identified that there is a 225mm diameter foul sewer in Parkhead Close which is suitable to receive foul water from the development site. However, it is noted that there is also a foul sewer in Applehaigh View and consultations are in hand with Yorkshire Water to determine the most suitable outfall location. It is almost certain that a foul pump station will be required for discharge to these locations and the proposed development scheme will need to accommodate a public pumping station to be located in an area to meet Yorkshire Water requirements.

Emergency Egress During Times of Flood

6.24 It is a requirement under the PPG that occupants should be able to egress any building during times of flood, without being trapped by flood conditions.

6.25 As the site falls within Flood Zone 1, no special mitigation measures are required for emergency egress during times of flood.

7.0 COMMENTS

7.1 The site falls within Flood Zone 1 and the Sequential Test is satisfied. However, in order to accommodate the possibilities of flood from extreme storm, blocked watercourse or blocked sewers, the following precautionary flood mitigation measures are recommended:-

7.1.1 Ground floors to the properties shall be set above external levels by a minimum of 150mm.

7.1.2 The properties shall be designed without any basements and ground floors shall comprise solid concrete slabs or beam and block with screed construction.

7.1.3 Incoming electricity supplies shall be raised above ground floor level and ground floor electric sockets shall be served by loops from first floor level.

7.1.4 The external alignment of the road and hard paved areas shall be raised to avoid surface water flooding and designed to direct any flood water through the site to either the northeastern corner with overflow into the watercourse, or to non-sensitive areas such as Public Open Space to allow ponding with no flooding to buildings.

7.2 A 40% increase in rainfall shall be incorporated into any new positive drainage system to satisfy the requirements of climate change.

7.3 Sustainable Drainage Systems of infiltration techniques are considered to be unsuitable on this particular site, due to the high water table.

7.4 The existing greenfield surface water discharge rate shall be agreed with the Land Drainage Authority.

7.5 The proposed surface water drainage system shall be restricted to the agreed discharge rate with appropriate attenuation for a 1 in 100 year storm plus climate change incorporated into the design, prior to discharge into the watercourse. The detailed design and calculations shall be submitted to the Planning Authority for approval prior to construction on the development site.

7.6 Any requirements for culverting of the open watercourse, the construction of headwalls, or regrading of the watercourse will require the consent of the Land Drainage Authority prior to construction on site.

7.7 Yorkshire Water have control of a surface water outfall to the watercourse on the eastern boundary and vehicular access for large tankers should be maintained if necessary as part of the scheme.

7.8 Foul drainage can discharge to the existing foul sewers either on Parkhead Close or Applehaigh View, and it is anticipated that a foul pumping station will need to be incorporated on the site.

7.9 No special mitigation measures are required for emergency egress during times of flood.

7.10 If any ground water issues are encountered during the works operations, then a land drainage system may need to be introduced to direct surface water through to the watercourse in a separate system to the curtilage water.

7.11 Subject to compliance with the above, the proposed development can satisfy the requirements of the National Planning Policy Framework and the Planning Practice Guidance in relation to flood risk.

A P P E N D I X A

SITE LOCATION PLAN

OS Grid Reference: SE 349 115

Rev	By	Date	Amendment	Chk
/	DJG	28.09.16	Issued for approval	MGS

Title

SITE LOCATION PLAN

Project/Client

LEE LANE, ROYSTON
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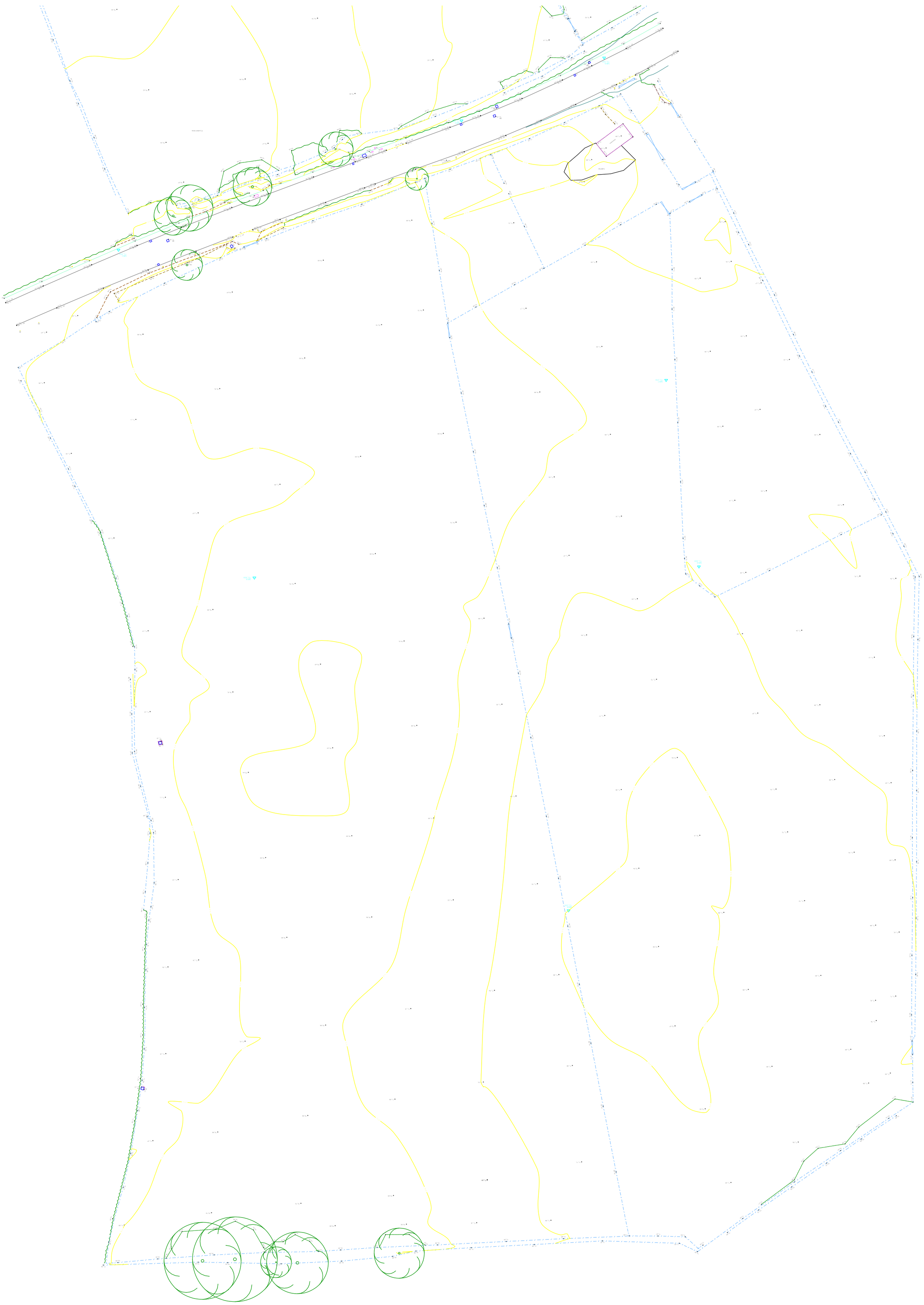
Scale	Drawn
1:5000 @ A4	DJG
Date	Chk.
SEP 16	MGS

Drg. No. 1048/88/NA

Rev /

A P P E N D I X B

TOPOGRAPHICAL SURVEY



A P P E N D I X C

JET AIRE DRAIN CARE REPORT

JET AIRE
DRAIN CARE

50075 ARP GEOTECHNICAL LTD
LEE LANE

Jet Aire (DC) Ltd

TOTAL DRAINAGE SOLUTIONS
www.jetaire.co.uk

Jet Aire (DC) Ltd, Northways Court, Great North Road, Aberford, Leeds, West Yorkshire LS25 3AU

JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD
Tel.: 0113 393 5500
Fax:
Email:

Table of contents

Project Name:	Project number:	Date:	Contact:	
50075 LEE LANE	50075	03/11/2016		

JET AIRE DRAIN CARE

JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD
Tel: 0113 393 5500
Fax:
Email:

Project-information

Project name :	Project Number :	Contact :	Date :
50075 LEE LANE	50075		02/11/2016

Client:	**ARP GEOTECHNICAL LTD**
Contact Name:	**MATTHEW STOKES**
Department:	
Road:	**SERVIA HILL**
Town:	**LEEDS**
County:	**WEST YORKSHIRE**
Telephone:	**0113 245 8498**
Fax:	
Mobile:	
E-mail:	

Site:	**LEE LANE**
Contact Name:	
Department:	
Road:	**LEE LANE**
Town:	**ROYSTON**
County:	
Telephone:	
Fax:	
Mobile:	
E-mail:	

Contractor	**JET AIRE DRAIN CARE**
Contact Name:	**LEE CLAYTON**
Department:	
Road:	**GREAT NORTH ROAD**
Town:	**ABERFORD**
County:	**WEST YORKSHIRE**
Telephone:	**0113 393 5500**
Fax:	
Mobile:	
E-mail:	

Place :

JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD
Tel: 0113 393 5500
Fax:

Defect Grade Description

Project Name :	Project number :	Contact :	Date :
50075 LEE LANE	50075		03/11/2016

1: Brick: No Structural Defects
Pipe: No Structural Defects

Acceptable Structural Condition

2: Brick: Minor cracking, Surface mortar loss, Spalling slight, wear slight
Pipe: Circumfrential crack, Moderate joint defects, Spalling slight, Wear slight

Minor collapse risk in short term but potential for further deterioration

3: Brick: Total mortorloss without other defects, single brick displaced, Deformation up to 5%, Spalling medium, Wear medium
Pipe: Fractures with deformation up tp 5%, Longitudinal cracking or mulitlpe cracking, Minor loss of level, More severe joint defects, Spalling medium, Wear medium

! Collapse unlikely in near future but future deterioration likely !

4: Brick: Total mortorloss with deformation greater than 10%, Deformation up to 10% and fractured, Displaced/hanging brickwork, Small number of missing bricks
Pipe: Broken, Deformation up to 10% and broken,, Fractured with deformation 5 - 10%, Multiple fractures, Serious loss of level, spalling large, wear large

!! Collapse likely in foreseeable future !!

5: Brick: Already Collapsed, Missing invert, Deformation over 10% and fractured, Displaced/hanging brickwork and deformation over 10%, Extensive missing bricks
Pipe: Already collapsed, Deformation over 10% and broken, Extensive areas of fabric missing, Fractured with deformation over 10%

!!! Collapsed or collapse imminent !!!

JET AIRE DRAIN CARE
GREAT NORTH ROAD
Street : ABERFORD
Tel: 0113 393 5500
Fax:
Email:

Inspection report

Date :	Job number :	Weather :	Operator :	Section number :	PLR SUFFIX:
02/11/2016	50075	no rain or snow	DC	1	X
Type of Drain:	**Vehicle :**	**Camera :**	**Flow Control:**	**Cleaned :**	**Client Job Number:**
Gravity drain/sewer	BJ11 NMZ	CRAWLER	No flow control	no	

Place :	ROYSTON, BARNSLEY	Location details:		U/S MH :	MH 1
Road :	LEE LANE	Catchment:		U/S Depth :	2.23
Location	Verge	Tape number :		D/S MH :	OUTFALL
Inspection	MH 1 (D/S) OUTFALL	Pipe Length		D/S Depth :	
Use:	Surface water		Pipe shape :	Circular	
Year laid :	Z		Pipe size :	750 mm	
Purpose :	Routine inspection of condition		Pipe material :	Concrete segments	
Total length :	81.79 m		Lining :		

Comment :

1:522

Position		Observation	Grade
Depth: 2.23			
0.00		Start node type, manhole reference number: MH 1	0
0.00		Water level, 10% of the vertical dimension	0
8.50	S01	Settled deposits, fine, 5% cross-sectional area loss, Start	2
10.04		Water level, 5% of the vertical dimension	0
13.73	F01	Settled deposits, fine, 5% cross-sectional area loss, End	2
23.91		Settled deposits, fine, 5% cross-sectional area loss	2
28.79		Settled deposits, fine, 5% cross-sectional area loss	2
31.42		Water level, 10% of the vertical dimension	0
31.42	S02	Settled deposits, fine, 5% cross-sectional area loss, Start	2
38.37		Settled deposits, fine, 10% cross-sectional area loss	3
41.25		Water level, 5% of the vertical dimension	0
41.25	F02	Settled deposits, fine, 5% cross-sectional area loss, End	2
41.25		General remark Remarks: MH 4	0
48.08		Roots, fine at joint	2
64.60		Settled deposits, fine, 5% cross-sectional area loss	2

JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD
Tel: 0113 393 5500
Fax:
Email:

Inspection Report

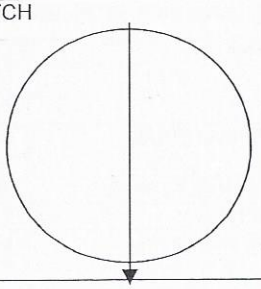
Date :	Job number :	Weather :	Operator :	Section number :	PLR :
02/11/2016	50075	no rain or snow	DC	1	X
Weather	Vehicle :	Camera :	Preset :	Cleaned :	Grade:
no rain or snow	BJ11 NMZ	CRAWLER		no	

1:522 Position	Observation	Grade
76.99	Settled deposits, coarse, 5% cross-sectional area loss	3
79.91	Settled deposits, coarse, 10% cross-sectional area loss	3
81.79	Survey abandoned LOSS OF TRACTION Remarks: LOSS OF TRACTION, DUE TO DEBRIS	0

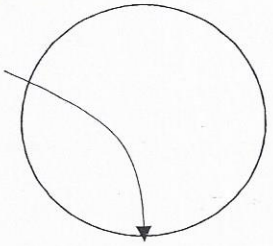
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	0	0	0	1	8	3	0.29	24	3

JET AIRE DRAIN CARE

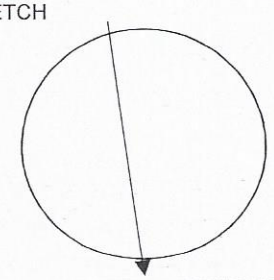
JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD, LEEDS LS25 3AU
Tel: 0113 393 5500, Fax: 0113 281 4910

SITE: LEE LANE, ROYSTON, BARNSLEY						DATE: 02/11/2016 JOB NO: 50075
MH NAME	FUNCTION			COVER		SKETCH
MH1	SURFACE	√		SQUARE	√	
	FOUL			TRIANGLE		
PIPE MATERIAL CONC & VC	COMBINED			RECTANGLE		
	TRADE EFFLUENT			CIRCULAR		
COVER SIZE (mm):	660					
DEPTH (m):	2.32					
PIPE SIZE(mm):	INLET	375 Ø	OUTLET	375 Ø		
NO. OF STEPS:	4					
LANDINGS:						
MANHOLE CHAMBER SIZE (mm):	1800					

MANHOLE CHAMBER SHAPE		MANHOLE CHAMBER CONSTRUCTION		COMMENTS
SQUARE		BRICK		
RECTANGLE		CONCRETE	√	
CIRCULAR	√	PLASTIC		
OTHER		OTHER		

MH NAME	FUNCTION			COVER		SKETCH
MH2	SURFACE	√		SQUARE	√	
	FOUL			TRIANGLE		
PIPE MATERIAL CONC	COMBINED			RECTANGLE		
	TRADE EFFLUENT			CIRCULAR		
COVER SIZE (mm):	600					
DEPTH (m):	1.775					
PIPE SIZE(mm):	INLET	450 Ø	OUTLET	450 Ø		
NO. OF STEPS:	2					
LANDINGS:						
MANHOLE CHAMBER SIZE (mm):	1500					

MANHOLE CHAMBER SHAPE		MANHOLE CHAMBER CONSTRUCTION		COMMENTS
SQUARE		BRICK		
RECTANGLE		CONCRETE	√	
CIRCULAR	√	PLASTIC		
OTHER		OTHER		

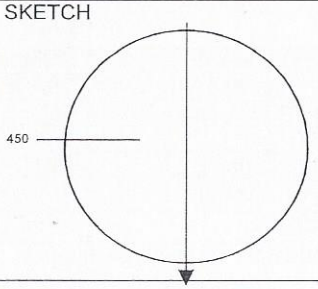
MH NAME	FUNCTION			COVER		SKETCH
MH3	SURFACE			SQUARE	√	
	FOUL	√		TRIANGLE		
PIPE MATERIAL VC	COMBINED			RECTANGLE		
	TRADE EFFLUENT			CIRCULAR		
COVER SIZE (mm):	600					
DEPTH (m):	2.21					
PIPE SIZE(mm):	INLET	225 Ø	OUTLET	225 Ø		
NO. OF STEPS:	4					
LANDINGS:						
MANHOLE CHAMBER SIZE (mm):	1200					

MANHOLE CHAMBER SHAPE		MANHOLE CHAMBER CONSTRUCTION		COMMENTS
SQUARE		BRICK		
RECTANGLE		CONCRETE	√	
CIRCULAR	√	PLASTIC		
OTHER		OTHER		

Our assessment of the drainage system is based upon our visual inspection and on information collated at the time of the survey. Where assumptions have been made these are based upon our experience and do not constitute any form of guarantee, nor do we guarantee that further deterioration will not occur following this survey. The CCTV CD/DVD will be forwarded with the report.

JET AIRE DRAIN CARE
GREAT NORTH ROAD
ABERFORD, LEEDS LS25 3AU
Tel: 0113 393 5500, Fax: 0113 281 4910

SITE: LEE LANE, ROYSTON, BARNSLEY					DATE: 02/11/2016
					JOB NO: 50075
MH NAME	FUNCTION		COVER		SKETCH
MH4	SURFACE	√	SQUARE	√	
	FOUL		TRIANGLE		
PIPE MATERIAL CONC	COMBINED		RECTANGLE		
	TRADE EFFLUENT		CIRCULAR		
COVER SIZE (mm):	660				
DEPTH (m):	1.95				
PIPE SIZE(mm):	INLET 750 Ø		OUTLET 750 Ø		
NO. OF STEPS:	3				
LANDINGS:					



MANHOLE CHAMBER SIZE (mm):	1800

MANHOLE CHAMBER SHAPE		MANHOLE CHAMBER CONSTRUCTION		COMMENTS
SQUARE		BRICK		
RECTANGLE		CONCRETE	√	
CIRCULAR	√	PLASTIC		
OTHER		OTHER		

Our assessment of the drainage system is based upon our visual inspection and on information collated at the time of the survey. Where assumptions have been made these are based upon our experience and do not constitute any form of guarantee, nor do we guarantee that further deterioration will not occur following this survey. The CCTV CD/DVD will be forwarded with the report.

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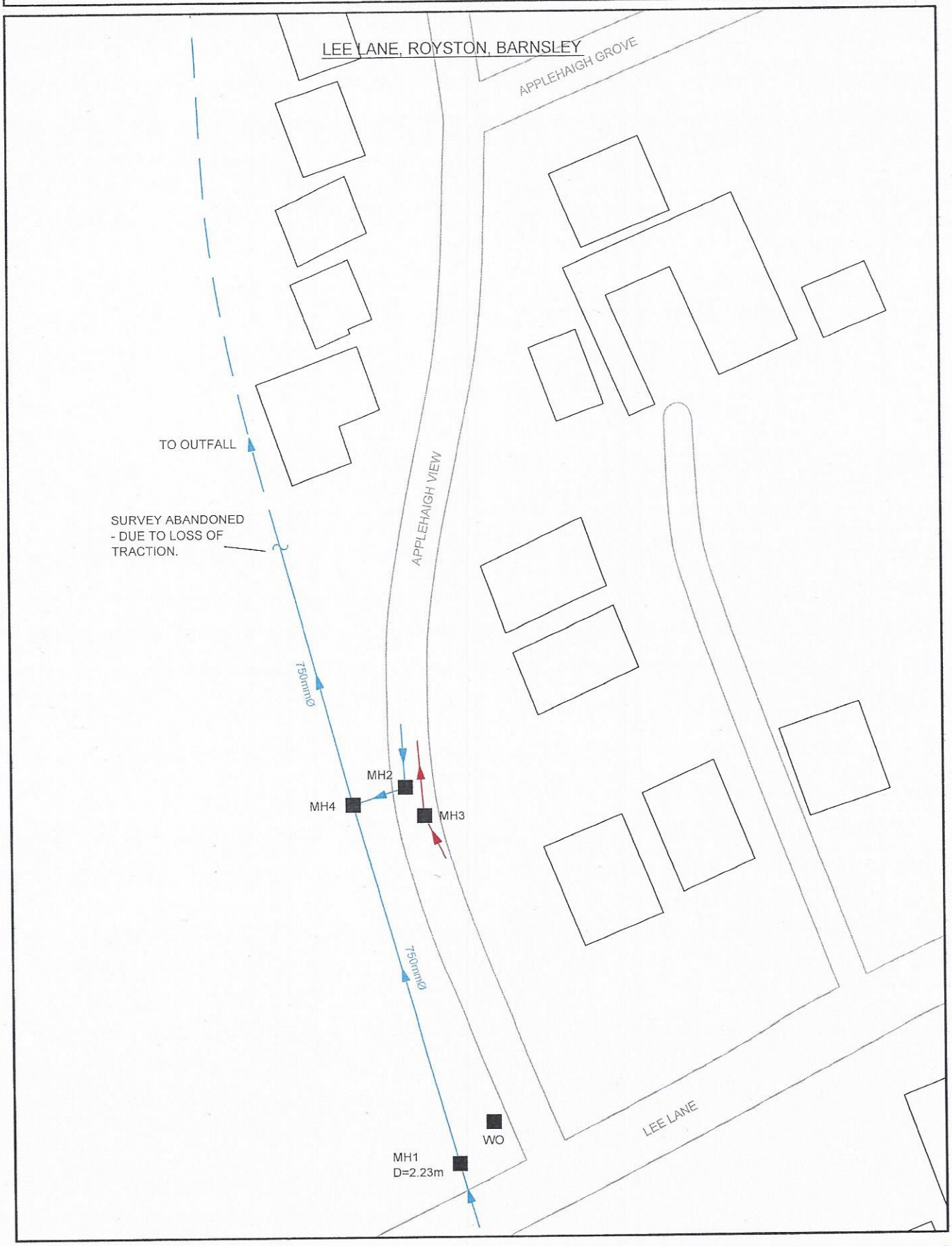

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Tel: 0113 393 5500, Fax: 0113 281 4910

Survey Notes: 50075 – Lee Lane, Royston, Barnsley, S71 4RT.

We were requested to attend site and undertake a CCTV survey and drain trace of the culverted watercourses on site, as instructed and directed by Alan on site.

- The following defects were noted.

Recommendations

Report Section	Start Node	End Node	Pipe size (mm)	Recommendation
1	MH 1	OUTFALL	750	The survey was abandoned at 81.79 metres due to debris. We recommend returning to site with a Jet-vac unit and CCTV van pack to cleanse the line and re-survey. Cost: £700.00+VAT.

The total cost for the recommended works mentioned above is **£700.00 + VAT**

A P P E N D I X D

ENVIRONMENT AGENCY CONSULTATION

Allan Poyser

From: Beech, Cheryl <Cheryl.Beech@environment-agency.gov.uk>
Sent: Tuesday 18 October, 2016 1:06 pm
To: Matthew Stokes
Subject: Your Enquiry: RFI/2016/24990
Attachments: flood risk & flood consequence assessments.pdf; Flood History Information.pdf; Flood History Map.pdf; Flood Map for Planning.pdf; Surface Water Map 1.pdf; Surface Water Map 2.pdf

Our Ref: RFI/2016/24990

Your Ref:

Dear Matthew

Provision of Product 4 for Lee Lane, Royston

Thank you for your request of 30 September 2016 to use Environment Agency data, in the development of the above site. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments.

Supporting Information

The Flood Map for Planning

The Environment Agency provides the Flood Map (see enclosed extract).

What is the Flood Map for Planning?

The Flood Map for Planning provides information on flooding from rivers and the sea for England and Wales. The Flood Map also has information on flood defences and the areas benefiting from those flood defences.

The Flood Map for Planning shows the following:

1. Flood Zone 3 (dark blue area on the enclosed map): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences
   - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year;
   - For flooding from the sea the map shows the extent of a flood with a 0.5% (1 in 200) chance of happening each year.

2. Flood Zone 2 (light blue area): natural flood plain area that could be affected by flooding from rivers and/or the sea – not taking into account the presence of any flood defences. Flood Zone 2:
   - indicates the extent of a flood with a 0.1% (1 in 1000) chance of happening each year.
   - and/or indicates the greatest recorded historic flood, whichever is greater.

Flood History

To the best of our knowledge there is no known flood history for this site. However, in close proximity to this location we do have some flood history available (see enclosed map).

Please note that this record now includes the 2015 flood levels and [DRAFT] extents. For Yorkshire as a whole there are some areas that are missing, this is because of a lack of data or low confidence. We will continue to review data and evidence throughout the summer, with a deadline of the end of September to upload the extents for a November publication date. These extents should therefore still be viewed as a draft output.

Water causing flooding can come from different places, for example from rivers or the sea; surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewers or drainage systems which have been overwhelmed or from groundwater rising up from underground aquifers.

Currently the Environment Agency can only supply flood risk data relating to the risk of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed. Local Authorities and/or Water Companies may be able to provide some knowledge on the risk of flooding from sources other than rivers and the sea and we are working with these organisations to improve knowledge and understanding of surface water flooding.

Assets

There are no flood defences helping to reduce flood risk in your area of interest.

Modelling

We do not have any modelling information at this location.

Climate Change

Please note that new guidance on climate change allowances for Flood Risk Assessments has been published in February 2016.
The new guidelines are available from:
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

River

Non Main River
The watercourse at this location is not designated as Main River. It is classed as an Ordinary Watercourse. The local authority holds responsibility for the maintenance of this river. The Environment Agency does not have any more information available in regard to past flooding issues or current flood risk. For any information on any past flooding and for any record of the impact of local drainage on that watercourse we suggest you speak to your City Council Drainage Section and to Yorkshire Water.

Other

Surface Water Map

Risk of flooding from surface water information.

Thank you for the enquiry regarding your site.

Attached is a map of showing the risk of flooding from surface water for this area, produced in partnership with Local Authorities.

Surface water flood risk is widely distributed and can happen far from rivers and the sea. It's sometimes hard to say whether you're in an area at risk of flooding from surface water because surface water flooding can follow many more paths and can be affected by very small features such as kerb height and even speed bumps. We recommend you consider not only whether your property is shown in or near an area at risk, but also the broader scale and pattern of surface water flooding shown in your area. You may also wish to view this and other flood risk maps on our website.

Whether your property is at risk will depend on the accuracy of the mapping in this area, and on the details of your property – for example, how waterproof the structure is, the levels of doors and airbricks, and whether you have installed any flood resilience measures such as airbrick covers and flood boards.

Information Warning

Please note:

It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does not provide an indicator of flood risk at an individual property / site level.

The flood risk information provided on the attached map does not cover other sources of flooding such as from rivers and sea.

Surface Water Drainage

The Lead Local Flood Authority is the statutory consultee for planning matters relating to surface water drainage, therefore it is recommended they should be consulted separately regarding this.

Surface water discharge from new development should ideally 'mimic' the pre-development situation using a sustainable drainage system so that the flow and volume of water in watercourses is not increased.

A permit may be required, under the Environmental Permitting Regulations 2010 from the Environment Agency for any proposed works or structures in, under, over or within eight metres of a 'main river' (e.g. a new outfall). A permit is separate to and in addition to any planning permission granted. Further details and guidance are available on the GOV.UK website: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Risk of Flooding from Reservoirs Map

Outlines and simplified depth and velocity maps can be viewed on our website:
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=reservoir&scale=1&textonly=off&ep=map&layerGroups=default&lang=_e&y=355134&x=357683#x=438988&y=406600&scale=2

Please, zoom into the location of interest, and then click on the inundated location for details. As a result a list of reservoirs will be provided with supporting information and a links to other data, such as estimated depths and speed of flooding, at the bottom of the result page.

A map of showing the outlines can also be provided on request.

Flood Warning

The site is not covered by a Flood Warning.

LIDAR Data

Please note that our LiDAR data is now available free of charge (Open Data) from http://environment.data.gov.uk/ds/survey/index.jsp#/survey (once zoomed to the relevant location the available LiDAR products will be listed below the map).

Two LIDAR products are available:

1. Tiled LIDAR data - The full tiled dataset consists of historic LIDAR data which has been gathered since 1998. For some areas we have carried out repeat surveys and data is available in a range of resolutions.
2. Composite LIDAR data - The composite dataset is derived from a combination of our full tiled dataset which has been merged and re-sampled to give the best possible spatial coverage.

Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. This technique results in the production of an accurate, cost-effective terrain model suitable for assessing flood risk and other environmental applications.

The Environment Agency owns two LIDAR systems, which are installed in a survey aircraft along with its other operational remote sensing instruments.

The aircraft is positioned and navigated using Global Positioning System (GPS) corrected to known ground reference points. The aircraft typically flies at a height of about 800 metres above ground level and a scanning mirror allows a swath width of about 600 metres to be surveyed during a flight.

The Rights & Responsibilities of a Riverside Owner

The owner of property adjacent to a watercourse is usually deemed to be the riparian owner and, as such, has both riparian rights and responsibilities with regard to the watercourse within their ownership.

The responsibility for general maintenance and repair of the watercourse and its banks rests with the riparian owner. For more information on Rights and Responsibilities of a riverside owner, you can visit our website at: https://www.gov.uk/government/organisations/environment-agency go to the Flooding and coastal change section and

click on ‘Riverside ownership: rights and responsibilities (‘living on the edge’) under the River maintenance section and download the ‘Living on the Edge’ booklet.

Alternatively type the following address into your web browser:
https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

Ordnance Survey Data

Under the terms of our licence agreement with the Ordnance Survey, we are unable to supply the OS data. Under this agreement we can only supply OS data to consultants/contractors carrying out work on our behalf.

Flood Portal

It’s a new 'one-stop shop' web portal providing guidance and information on flood risk management in the UK. Arup have written and designed the site, in conjunction with CIRIA, the Local Government Association, the EA and Defra, primarily as a resource for local authority officers, flood risk management professionals, and others with an interest in flood risk. It’s a part of the Capacity Building Strategy.

http://www.local.gov.uk/floodportal

This information is provided subject to the Open Government Licence (here) - please read for details of permitted use.

If you have any queries or would like to discuss the content of this letter further please contact us on the telephone number below.

We would be really grateful if you could spare five minutes to help us improve our service. Please click on the link below and fill in our survey – we use every piece of feedback we receive:

http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=Y

Yours sincerely

Cheryl Beech
Customers and Engagement Team
✉ **Environment Agency, Lateral, 8 City Walk, Leeds. LS11 9AT**
☎ **General Enquiries Team 020 847 48174**

☎ **Direct 020 3025 6412 *(internal 56412)***
neyorkshire@environment-agency.gov.uk

Please note my working days are Tuesday, Wednesday and Thursday

Please consider the Environment before printing this email.

Use of Environment Agency Information for Flood Risk / Flood Consequence Assessments

Important
If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:-

http://www.environment-agency.gov.uk/research/planning/33580.aspx

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

http://www.environment-agency.gov.uk/research/planning/82587.aspx

http://www.communities.gov.uk/publications/planningandbuilding/nppftechnicalguidance

http://www.communities.gov.uk/publications/planningandbuilding/pps25guideupdate

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

In **Wales,** you should refer to TAN15 for information about what flood consequence assessment is needed for new development in the different flood zones
http://new.wales.gov.uk/splash;jsessionid=8ylGTfGZthmB0t2vhp6hS1GcB1LXvZzB3Ylczf20Xn7LK3zK0nMk!981825250?orig=/topics/planning/policy/tans/tan15/

You should also consult the Strategic Flood Consequence Assessment if one has been produced by your local planning authority.

In both **England and Wales** you should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk / Consequence Assessment (FRA / FCA) where one is required, but does not constitute such an assessment on its own.

2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.

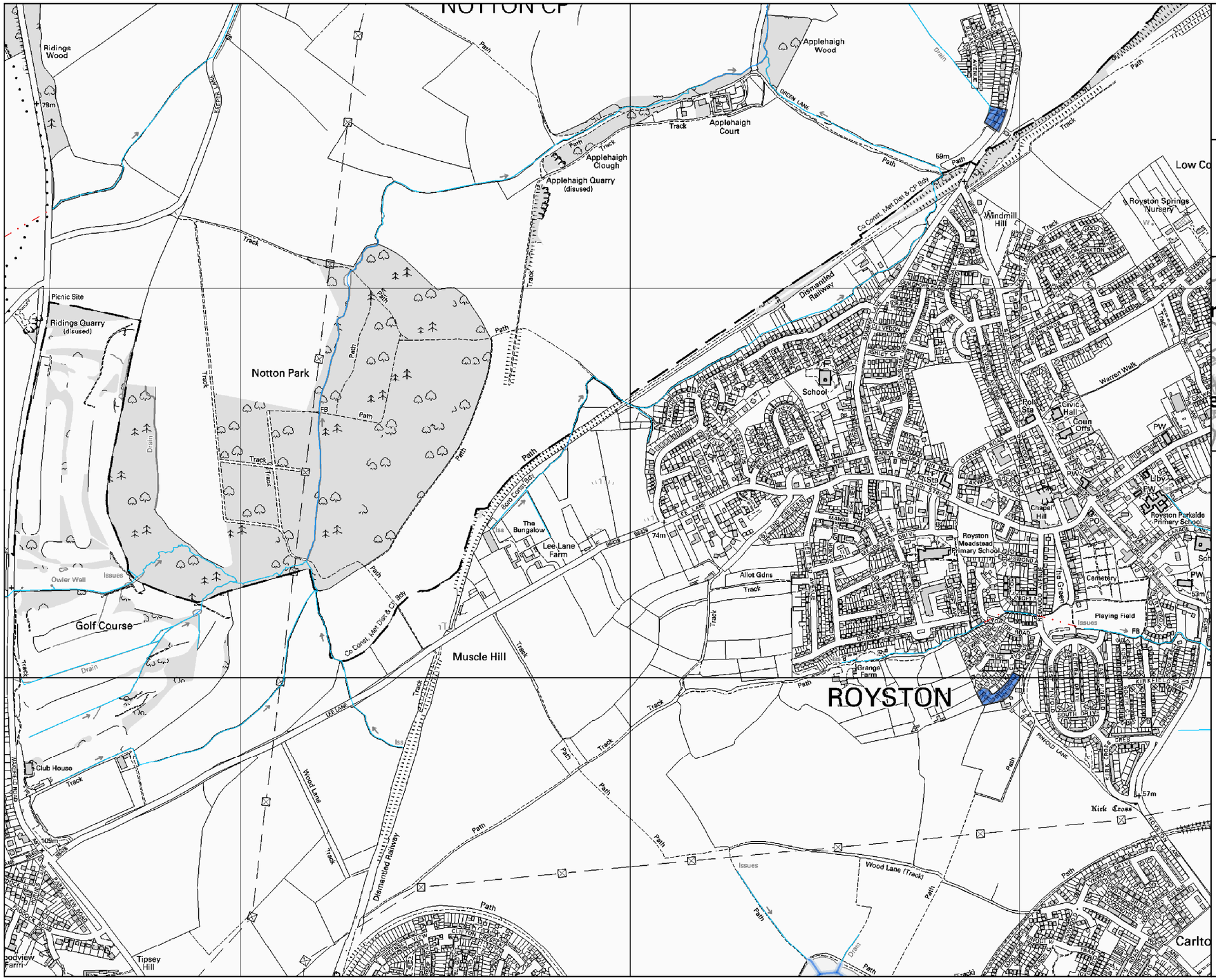
3. Where a planning application requires a FRA / FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.

4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

Flood History Information - RFI: 24990

Name	Start Date	End Date	Source of Flooding	Cause of Flooding	Source of Boundary
June 2007 Surface Water Flooding Yorkshire	15/06/2007	25/06/2007	Other	Unknown	Aerial Photography

Flood History Map for Land off Lee Lane, Royston
RFI: 10286 Date Created: 22/06/16



www.environment-agency.gov.uk

Scale: 1:10,000

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Historical Flood Extents and Levels

LEGEND

Detailed River Network

CDS_CONTEXT.DRN.RIVERTYPE

- Primary River
- Secondary River
- Tertiary River
- D/S of High Water Mark
- D/S of Seaward Extension
- Lake / Reservior
- Canal
- Extended Culvert (greater than 50m)
- Canal Tunnel
- Underground River (inferred)
- Underground River (local knowledge)
- 2007 Flood Event Surface Water Flood Extent

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