

NYM / 2008 / 0796 / FL

**RAITHWAITE HALL ESTATE
SANDSEND ROAD (A174) WHITBY**

FLOODING & DRAINAGE STATEMENT

CONTENTS:

- 1.0 INTRODUCTION
- 2.0 FLOODING ISSUES
- 3.0 DRAINAGE



APPENDICES:

- APPENDIX A - SITE LOCATION PLAN (FIG. 1)
- APPENDIX B - SITE PLAN (FIG. 2) & SITE TOPOGRAPHICAL SURVEY -ADJACENT RAITHWAITE HALL (FIG. 3)
- APPENDIX C - CATCHMENT AREA PLAN (FIG. 4)
- APPENDIX D - INDICATIVE FLOOD PLAIN MAP (FIG. 5)
- APPENDIX E - SCARBOROUGH COUNCIL LETTER dated 7 November 2007 Ref: JW/MD/S2
- APPENDIX F - SITE PHOTOGRAPHS - NEWHOLM BECK
- APPENDIX G - EXTRACT FROM PUBLIC SEWER RECORDS

1.0 INTRODUCTION

NYM / 2008 / 0796 / FL

- 1.01 Following instructions from D Bamford Architects on behalf of Mr G Douglas on 9 September 2007, CoDA Structures have undertaken an initial assessment of flooding and drainage issues for a hotel development on the Raithwaite Hall Estate, Sandsend Road, Whitby.
- 1.02 The estate is currently developed with Raithwaite Hall, which is used for storage and offices, several outbuildings which are also used for storage, greenhouses and several holiday cottages.
- 1.03 It is proposed to convert and extend Raithwaite Hall into a hotel.
- 1.04 The Ordnance Survey coordinates for the centre of the site are 486590 mE and 511430 mN.
- 1.05 The site is approximately 26.8 hectares in area.
- 1.06 The local authority is Scarborough Borough Council (SBC).
- 1.07 A site location plan (Fig 1) is attached in Appendix A.
- 1.08 A site plan (Fig. 2) is attached in Appendix B.

**2.0 FLOODING ISSUES**

- 2.01 Two watercourses, Dunsley Beck and Newholm Beck, run through the Raithwaite Hall Estate. The two becks converge at the northern end of the estate prior to flowing under Sandsend Road (A174) through a culvert, and discharging onto the beach to the north. Several tributaries run into both becks within the site as well, as to the south west. Both watercourses on the site are located in relatively deep steep-sided valleys, and the buildings on the site are generally well elevated above the adjacent beck water level.
- 2.02 From inspection of Ordnance Survey plans the catchment for Dunsley and Newholm Becks lies predominantly to the south west of the Raithwaite Hall Estate and appears to cover approximately 500 – 525 hectares. The catchment area plan (Fig. 4) is attached in Appendix C.
- 2.03 Dunsley Beck runs through the western sector of the site. A weir and waterfall are present on the beck within the site.
- 2.04 Land immediately adjacent Dunsley Beck in the northern sector of the estate is indicated as fluvial and/or tidal flood plain. However, the mean high tide line is located approximately 175m to the north on the beach. The indicative flood plain map (Fig. 5) is attached in Appendix D.

NYM / 2008 / 0796 / FL

- 2.05 Dunsley Beck is set in its own valley and cannot impact on Raithwaite Hall due to the topography of the estate.
- 2.06 The site owner has advised that the occupied/used areas of the site are not prone to flooding. In addition Scarborough Borough Council have advised that they are not aware of any flooding problems associated with the two watercourses on the site. A copy of the letter received from Scarborough Borough Council is attached in Appendix E.
- 2.07 Newholm Beck runs through the centre of the estate in near proximity to Raithwaite Hall. A dam/weir has been constructed across the beck in the southern sector to form a large lake. The lake has a 2.2m wide steeply sloping weir outlet and a waterfall. The lake also has a horizontal overflow outlet which runs back into the beck immediately downstream of the dam. The overflow pipe appears to be approximately 600mm in diameter. The overflow was not running at the time of inspection. The water level in the lake was surveyed on 6 December 2007 as approximately 47.900m AOD, with an approximate 20mm depth of flow over the weir.
- The beck between the lake and the Hall has been generally canalised with masonry walls. The weir adjacent the Hall is approximately 2.1m wide, with a depth of flow at approximately 20mm over the weir. The water course is culverted under Outbuilding No. 2, and has been canalised with a concrete open channel adjacent Outbuilding No. 1.
- In total four weirs, two waterfalls, two footbridge crossings and two vehicle crossings are present on the beck within the estate.
- The main features on Newholm Beck are indicated on the site plan in Appendix B and photographs are attached in Appendix F.
- 2.08 The extension of the Hall will require the demolition of existing buildings alongside Newholme Beck. However, two outbuildings, one immediately adjacent the beck and the other spanning the beck, are also proposed for conversion.
- 2.09 The floor levels of the existing buildings and proposed extension will be as follows:-

Building	Finished Floor Level (m AOD)
Raithwaite hall (Existing)	45.90
Raithwaite Hall (Extension)	43.60
Outbuilding No. 1 (Existing)	43.75
Outbuilding No. 2 (Existing)	43.55

NYMNPA
27 OCT 2008

- 2.10 The profile and water levels (as at 6 December 2007) of the beck alongside the Hall are summarised in the following table:-

Location	Profile	Water level (m AOD)
Immediately upstream of the Hall	Generally masonry walled channel	42.85
Alongside the Hall	Rectangular culvert approximately 2.0m wide x 2.05m deep under building and Vehicle Crossing	40.50
Immediately downstream of the Hall	Concrete open channel approximately 2.4m wide x 2.05m deep	39.74

- 2.11 From a visual inspection of the topography of the site there appear to be no alternative flood routes to Newholme Beck within the estate.
- 2.12 Due to the topography of the surrounding area the estate is not considered to be at risk from the inundation of flood waters from other watercourses.
- 2.13 As there are no sewers within the vicinity of the Estate there is no risk from the inundation of flood waters from overloaded sewers on higher ground around the site.

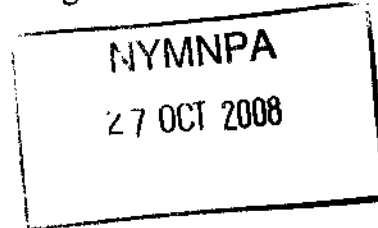
Conclusions:

- 2.14 From the historical evidence and advice from Scarborough Borough Council it would appear that the proposed development is not at significant risk from the potential flooding of Newholm Beck.
- 2.15 The location of Dunsley Beck is such that it is not considered to pose a risk of flooding to the proposed development.
- 2.16 In times of heavy rainfall the flow of water would be controlled/limited by the weir and overflow pipe to the lake upstream of the Hall. Therefore, in terms of heavy rainfall, the water level in the lake would rise and the lake would act as a storage facility. Should the lake dam overtop, flood waters would flow down the beck valley. Should it be deemed necessary to assess the storm return period in which this would occur, a full catchment area analysis would be required.
- 2.17 Without a detailed catchment area analysis it would be prudent to set new finished floor levels as high as possible. This would involve lifting the existing finished floor levels to both Outbuildings 1 and 2. In addition, the beck wall adjacent the Hall and immediately upstream of the weir could be raised, together with the raising of ground levels adjacent the stream to the south of the Hall, to afford the proposed extension further protection against potential flooding in extensive rainfall events.
- 2.18 The site does not appear to be at risk from the inundation of flood waters from overloaded sewers or other watercourses from higher ground surrounding the estate.

NYM NPA
27 OCT 2008

- 2.19 External site levels should be designed to route and channel any potential flood waters from Newholme Beck or the overloading of existing sewers on the site around the buildings back to the beck channel.

3.0 DRAINAGE:



- 3.01 Yorkshire Water has advised the following with regard to foul water:-

There are no public gravity foul or combined sewers in the vicinity of the estate.

- 3.02 Disposal of foul water from the proposed development, as with the existing buildings on the site, will be by the use of a package treatment plant on the site, with the discharge of treated effluent to Newholm Beck. Effluent quality will be 30/20 mg/l Biological Oxygen Demand/Suspended Solids, and a formal discharge consent will be obtained from the Environment Agency.

- 3.03 Yorkshire Water has advised the following with regard to surface water:

There are no public surface water or combined sewers in the vicinity of the estate.

- 3.04 An extract of the public sewer record is attached in Appendix G.

- 3.05 The use of conventional soakaways on the site will be subject to ground conditions and appropriate testing. However, the near surface soils are expected to be relatively impermeable clays and soakaways are unlikely to be viable.

- 3.06 The area of the proposed extension on the estate is already developed and has positively drained hardcover areas to Newholm Beck. In these areas surface water discharge will be restricted to the current discharge rate.

- 3.07 In areas of the estate that are currently undeveloped and are without any positively drained hardcover areas, surface water discharge will need to be restricted to greenfield run-off. The local drainage authority, SBC, has agreed that surface water from such areas on the development can be discharged to Newholm Beck at 20.0 litres/second/hectare. The SBC letter dated 7 November 2007 reference JW/MA/S2 is attached in Appendix E.

- 3.08 Stormwater storage would be sized on a 1:100 year storm return period. However, if required by SBC an allowance for climate change may also need to be incorporated within the design.

NYM / 2008 / 0 7 9 6 / F L

Conclusions:

- 3.09 Foul water from the development will require treatment by a package treatment plant with discharge of treated effluent to Newholm Beck.
- 3.10 If ground conditions prove suitable surface water will be disposed by soakaway.
- 3.11 Surface water discharge from previously developed areas of the site will be restricted to the current rate of discharge.
- 3.12 Scarborough Borough Council has advised that surface water from previously undeveloped areas will need to be restricted to 20 litres/second/hectare..
- 3.13 Stormwater storage provided on the development will be designed for a 1:100 year storm return period.



Signed:
J Lawrence B Eng C Eng M I Struct E

CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY
FLOODING & DRAINAGE STATEMENT**

NYM / 2008 / 0796 / FL



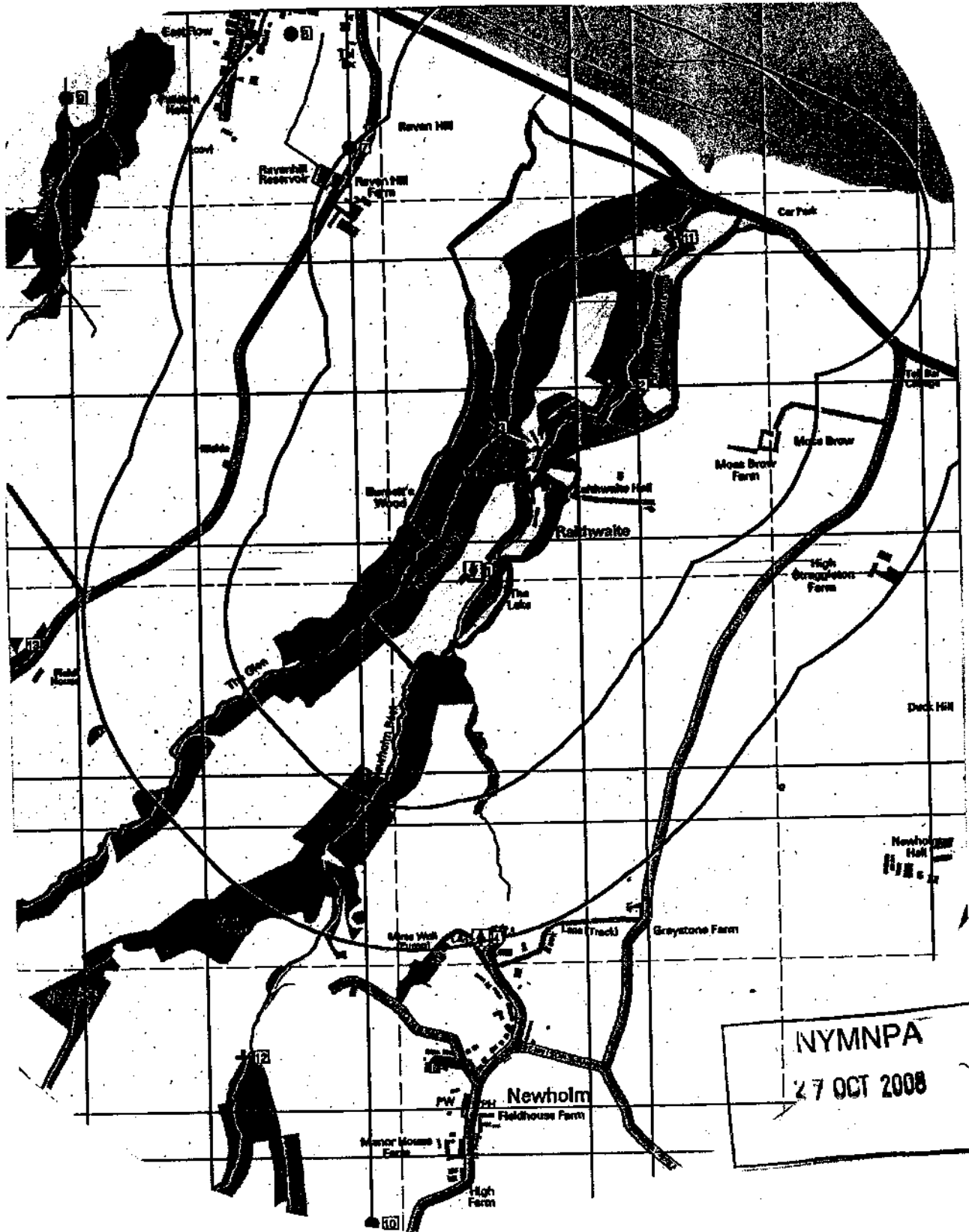
APPENDIX A
SITE LOCATION PLAN (FIG. 1)

CoDa+ Structures

Consulting Civil & Structural Engineers

No 2 Barewood Yard
 Harewood
 Leeds LS17 9LF
 Tel: 0113 268 6766
 Fax: 0113 268 6765

Project		Raithwaite Hall Whitby		
Title		Site Location Plan		
Drawn	JL	Date	02.07	Drwg. No.
Scale	1:10000	Checked	JL	6196/Fig1
				Rev.
				-



NYMNPA
 27 OCT 2008

CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

FLOODING & DRAINAGE STATEMENT

NYM / 2008 / 0796 / FL

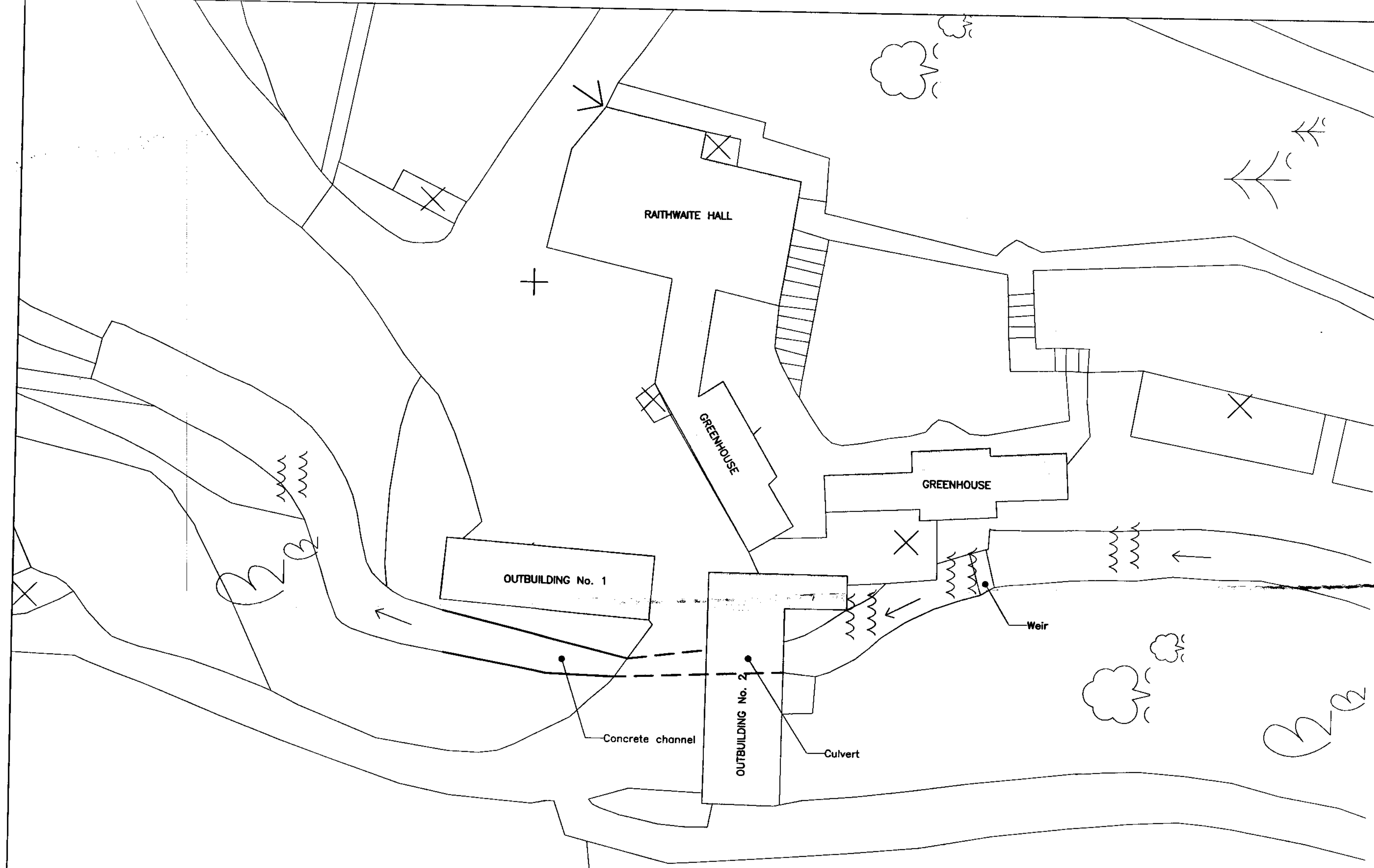
NYMNPA

27 OCT 2008

APPENDIX B

SITE PLAN (FIG. 2) & SITE TOPOGRAPHICAL SURVEY ADJACENT RAITHWAITE HALL (FIG. 3)

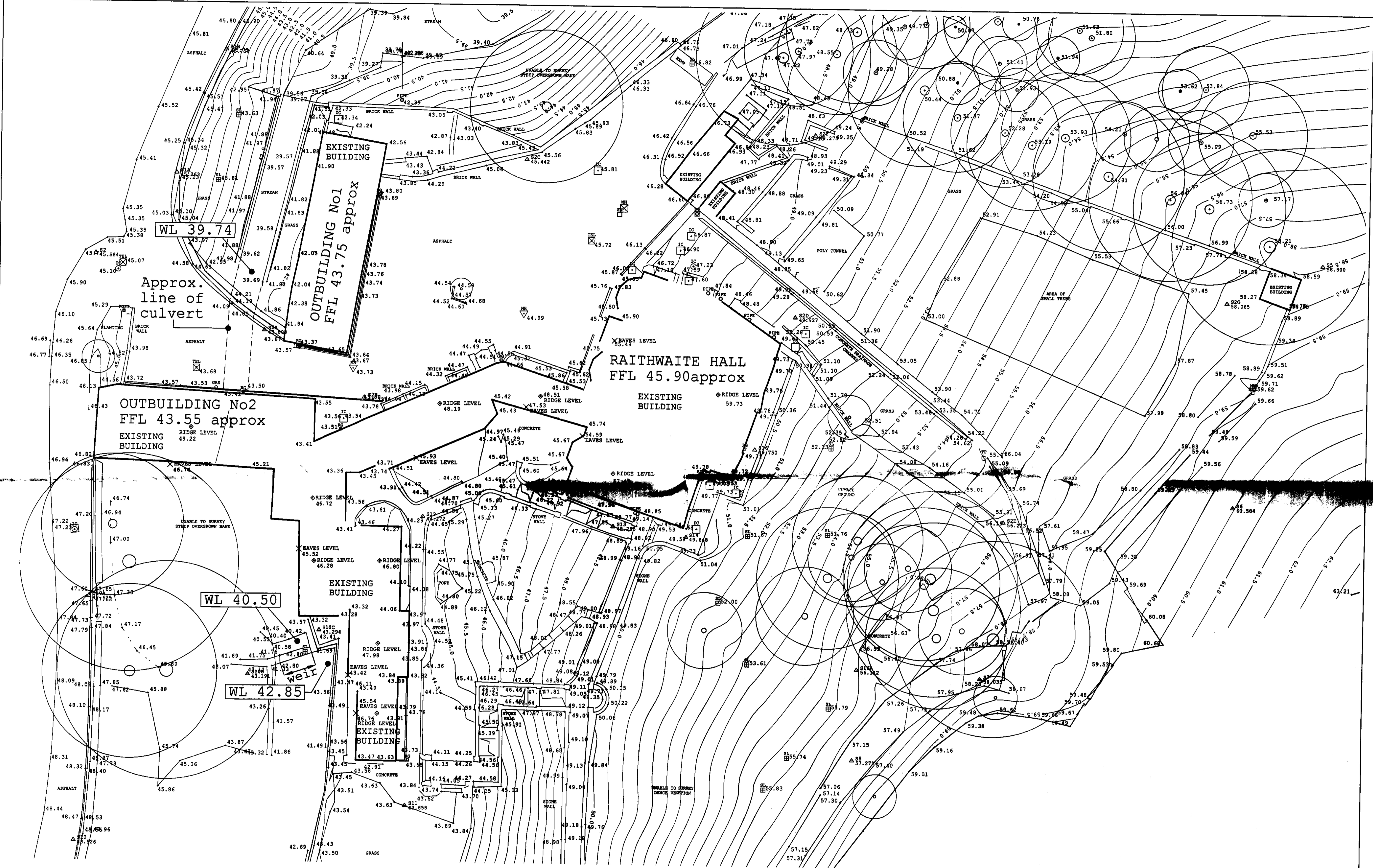
Notes
 NYM / 2008 / 0796 / FL



Rev.	Content	Date

Client: Mr G Douglas			
Project: Raithwaite Hall, Whitby			
Title: Site Plan - Raithwaite Hall			
Drawn: ED	Date: 12.07	Fig. No.:	Rev.:
Scale: 1:250	Checked: JL	6196/fig2	-

CoDa Structures
 Consulting Civil & Structural Engineers
 No 2 Barrow Yard
 Harwood
 Leeds LS17 9LF
 Tel: 0113 286 6766
 Fax: 0113 286 6765



Notes
 1. Water levels surveyed by dumpy level on 6 Dec 2007

Rev.	Content	Date

CoDa Structures
 Consulting Civil & Structural Engineers
 No 2 Harewood Yard
 Harewood
 Leeds LS17 9LF
 Tel: 0113 288 6766
 Fax: 0113 288 6765

Client	Mr G Douglas		
Project	Raithwaite Hall, Whitty		
Title	Topographical Survey Adjacent to Hall		
Drawn	Date	Drp. No.	Rev.
SJ	12.07		
Scale	Checked	6196/Fig3	
1:200	JL	-	

CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

FLOODING & DRAINAGE STATEMENT

NYM / 2008 / 0 7 9 6 / F L

NYMNPA

27 OCT 2008

APPENDIX C

CATCHMENT AREA PLAN (FIG. 4)

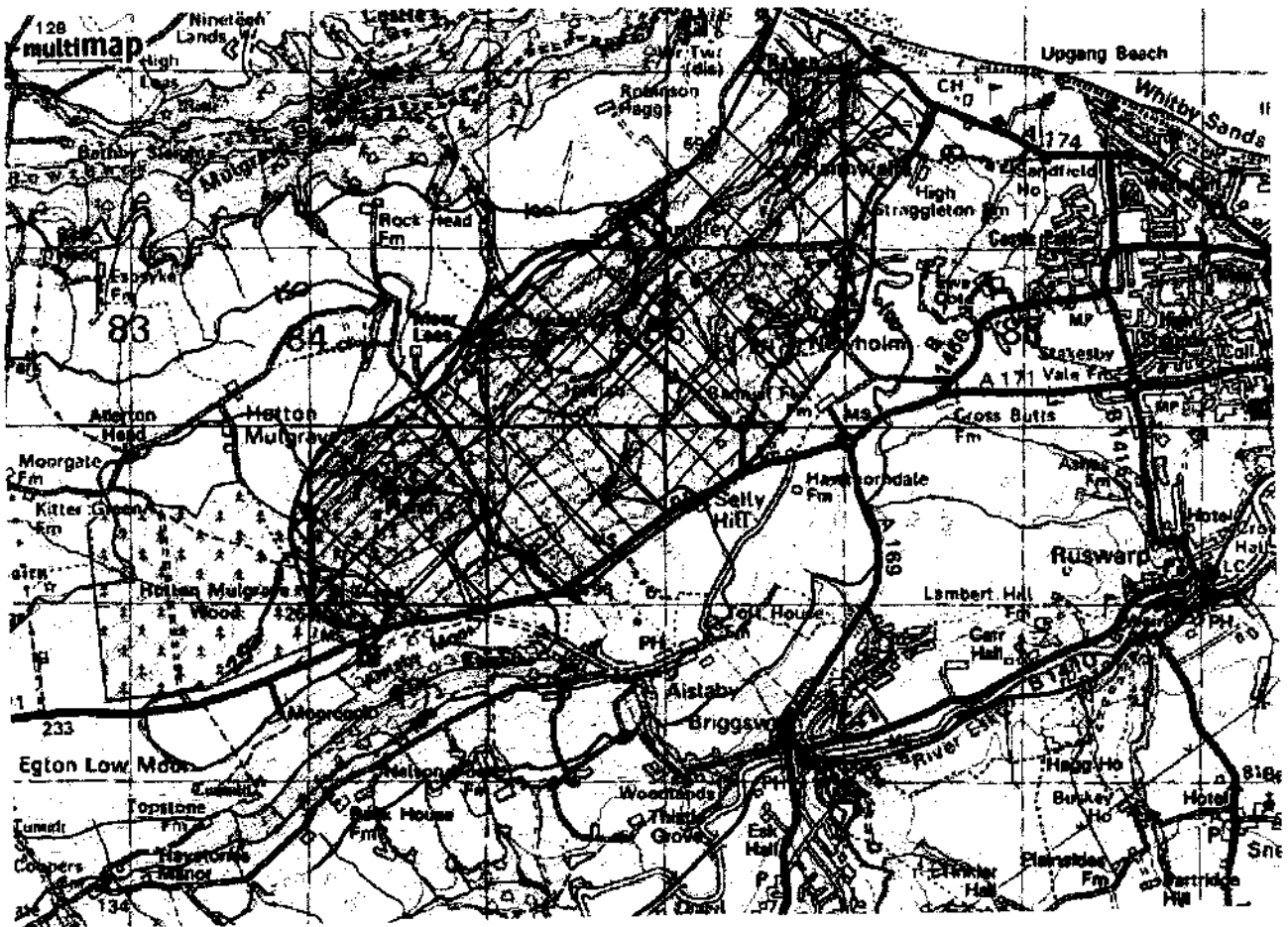
CoDa+ Structures

Consulting Civil & Structural Engineers

No 2 Bawwood Yard
Bawwood
Leeds LS17 9LJ
Tel: 0113 286 6766
Fax: 0113 286 6765

Project	Raithwaite Hall Whitby			
Title	Catchment Area Plan			
Drawn	JL	Date	02.07	
Scale	NTS	Checked	JL	
Drwg. No.	6196/Fig4		Rev.	-

NYM / 2008 / 0796 / FL



NYMNP
47 OCT 2008

CoDa Structures

Consulting Civil & Structural Engineers

No. 2 Harewood Yard,

Harewood, Leeds

LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

FLOODING & DRAINAGE STATEMENT

NYM / 2008 / 0 7 9 6 / F L

NYMNPA

27 OCT 2008

APPENDIX D

INDICATIVE FLOOD PLAIN MAP (FIG. 5)

Notes
 NYM / 2008 / 0796 / FL



NYMNP
 27 OCT 2008

Rev.	Content	Date

Client Mr G Douglas			
Project Rathwaite Hall, Whitby			
Title Indicative Flood Plain Map			
Drawn SJ	Date 12.07	By No.	Rev.
Scale Checked JL	6196/Fig5		

CoDa+ Structures
 Consulting Civil & Structural Engineers
 No 2 Barwood Yard
 Barwood
 Leeds LS17 8LP
 Tel: 0113 288 6768
 Fax: 0113 288 6765

CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

FLOODING & DRAINAGE STATEMENT

NYM / 2008 / 0796 / FL

NYMNP
A

27 OCT 2008

APPENDIX E

**SCARBOROUGH BOROUGH COUNCIL
LETTER DATED 7 NOVEMBER 2007 (Ref: JW/MD/S2)**

Client: MR G DOUGLAS
Project No: 6196
Date: 7 December 2007 – Rev. A

Scarborough Borough Council
Highway Services
10 Skinner Street
Whitby
North Yorkshire
YO21 3AD



NYM / 2008 / 0796 / FL
Contact: Mr J Woodhead
Tel: [REDACTED]
Fax: [REDACTED]
e-mail: [REDACTED]
Web site: www.scarborough.gov.uk
DX 719232 Scarborough 5

Scarborough Borough Council

Your Ref:
Our Ref: JW/MD/S2

7th November 2007

CoDa Structures
No 2 Harewood Yard
Harewood
LEEDS
LS17 9LF

MNPA
27 OCT 2008

Dear Sirs

Raithwaite Hall - Sandsend, Whitby

I acknowledge receipt of your letter dated 15th October 2007 and would apologise for my delay in responding due to being away from the office for some weeks.

I am not aware of any flooding problems associated with the two watercourses at this location and as land drainage authority I would confirm that your discharge of 20 litres/sec/hectare is acceptable.

Yours faithfully

[REDACTED]
Woodhead
Northern Area Engineer

NO	/
:	:
:	:
RECEIVED 12 NOV 2007	
REPLIED	
COPY TO	DATE



CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

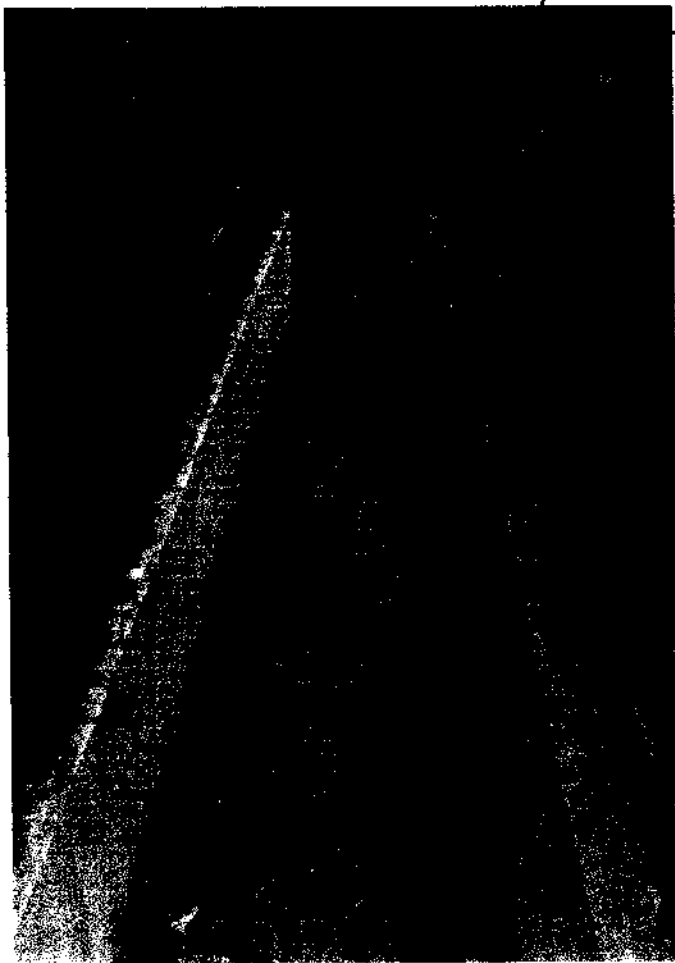
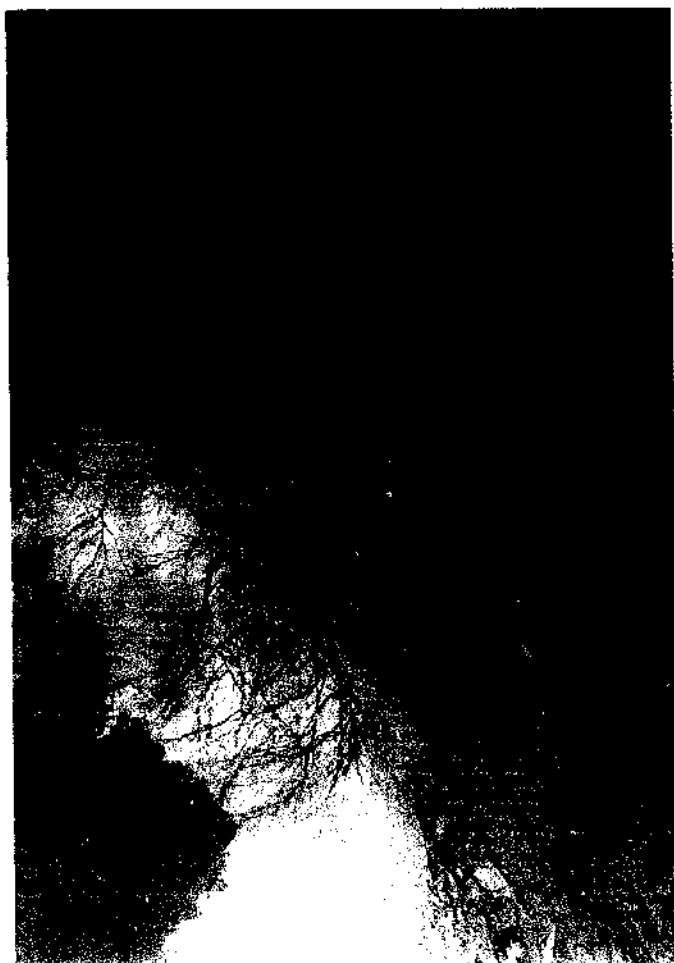
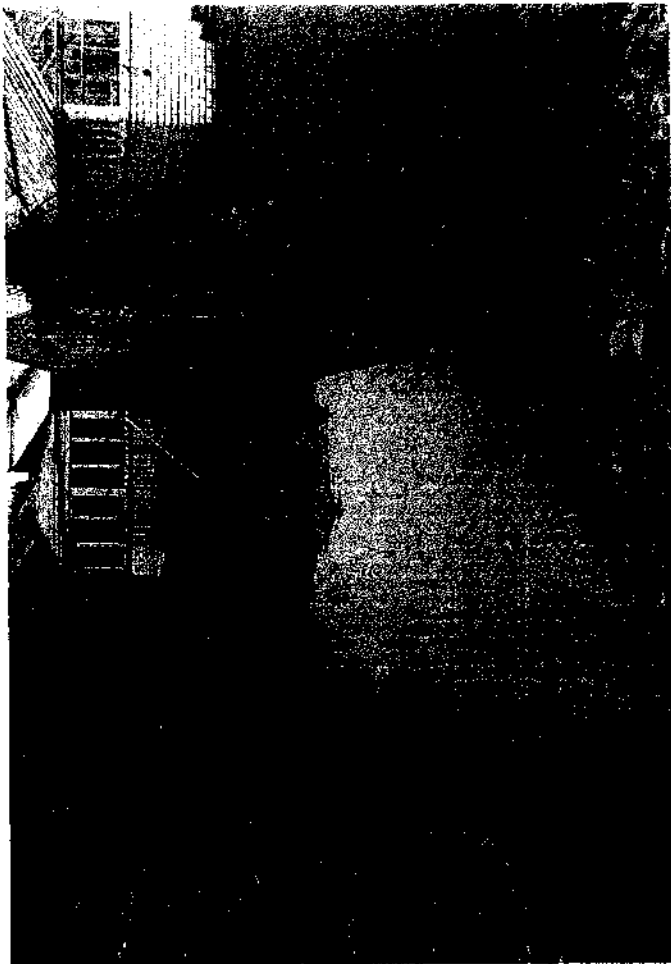
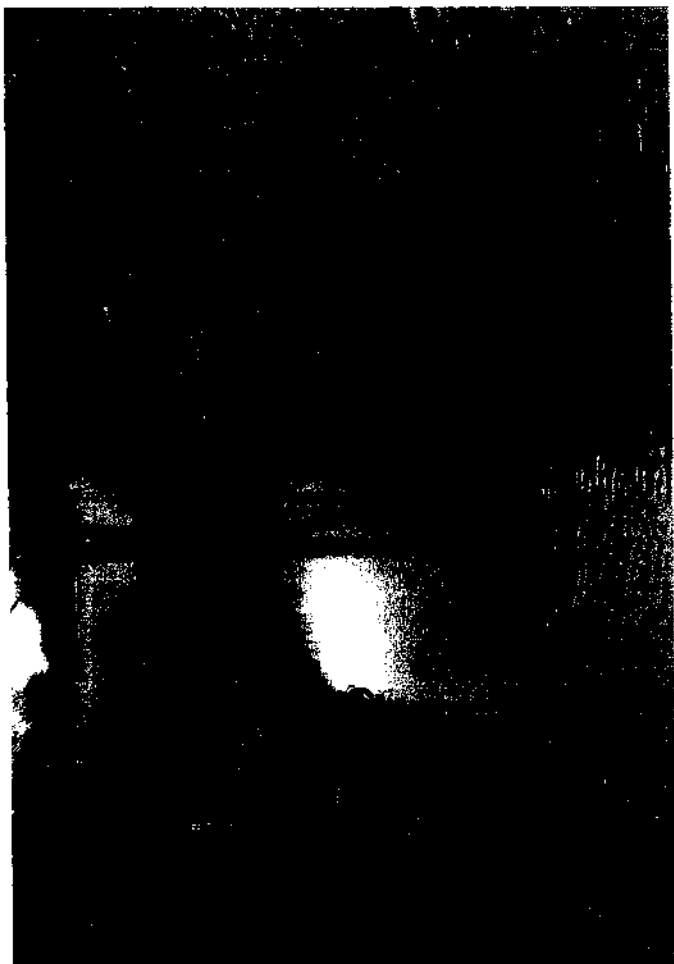
FLOODING & DRAINAGE STATEMENT

NYM / 2008 / 0 7 9 6 / F L

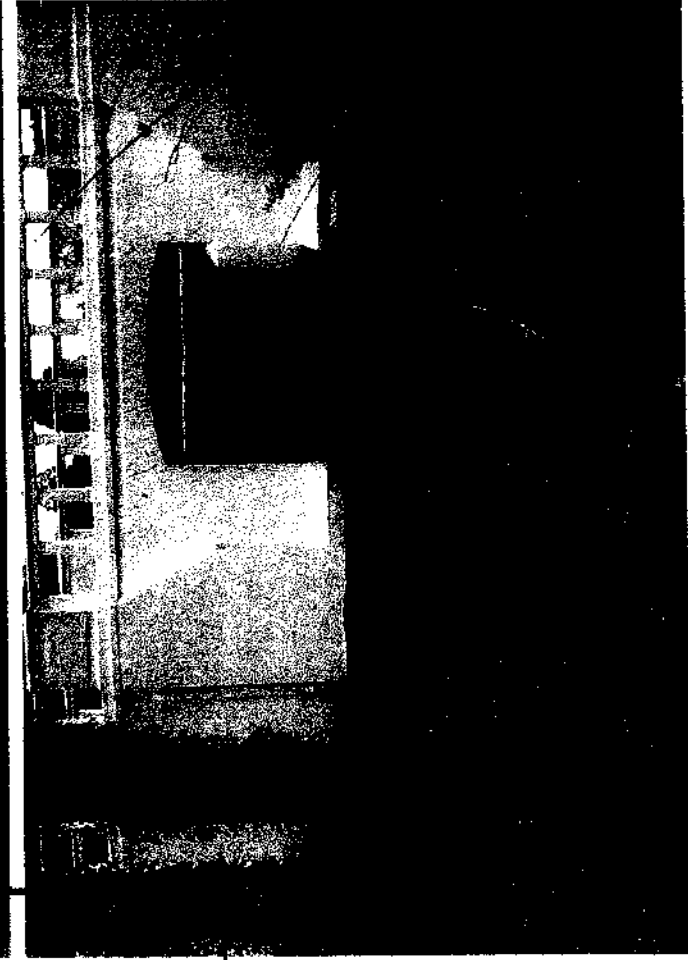


APPENDIX F

SITE PHOTOGRAPHS – NEWHOLM BECK

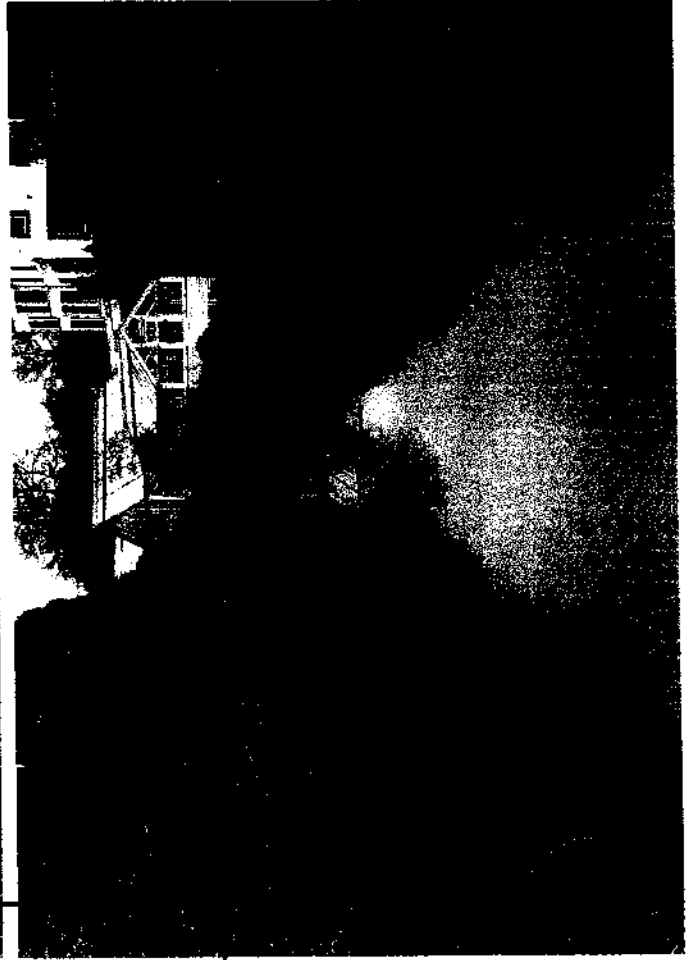
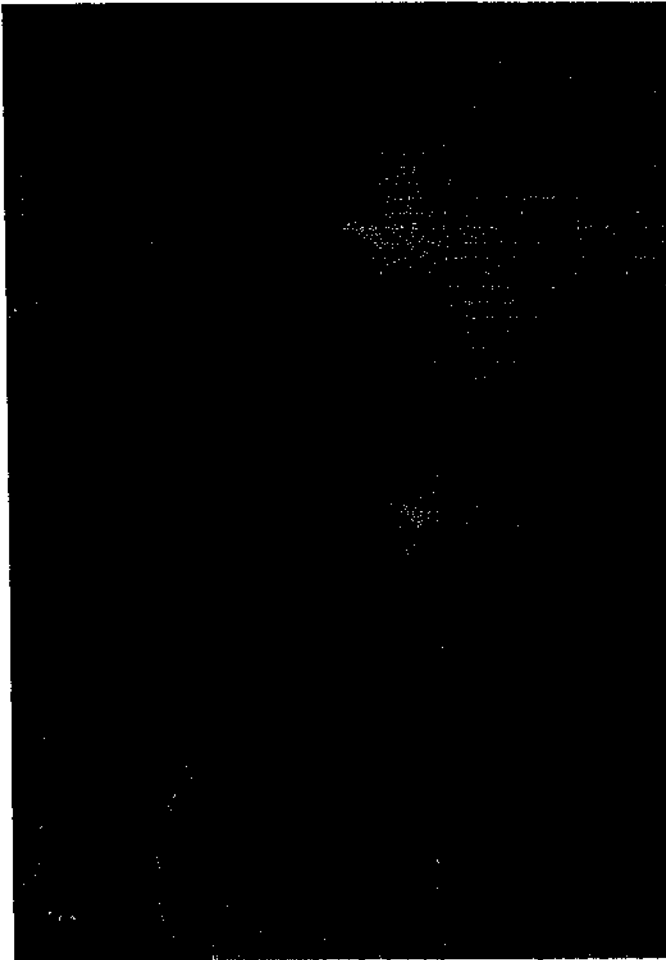
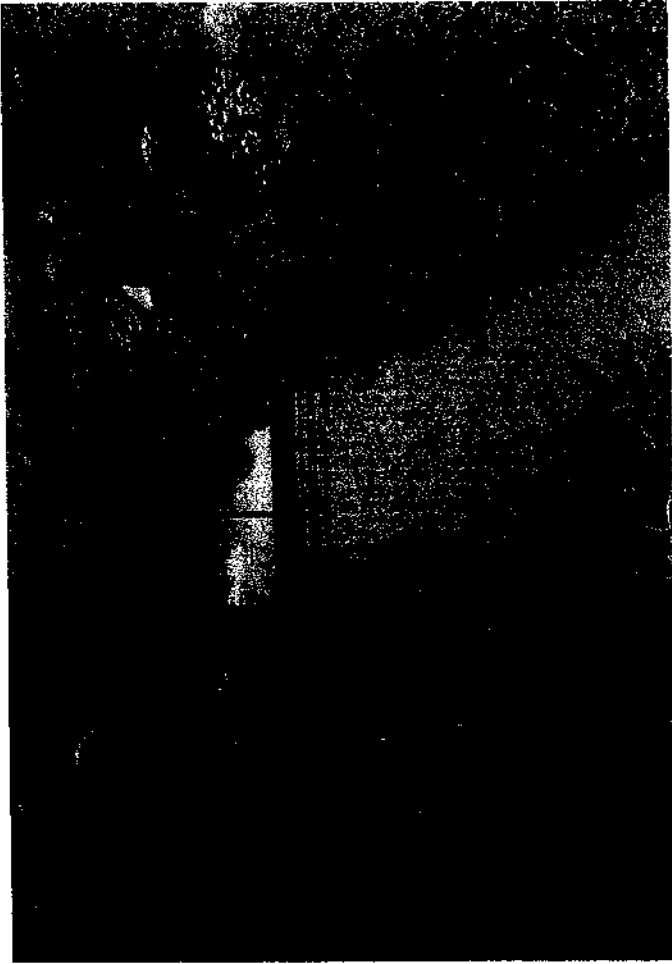


NYM / 2008 / 0796 / FL

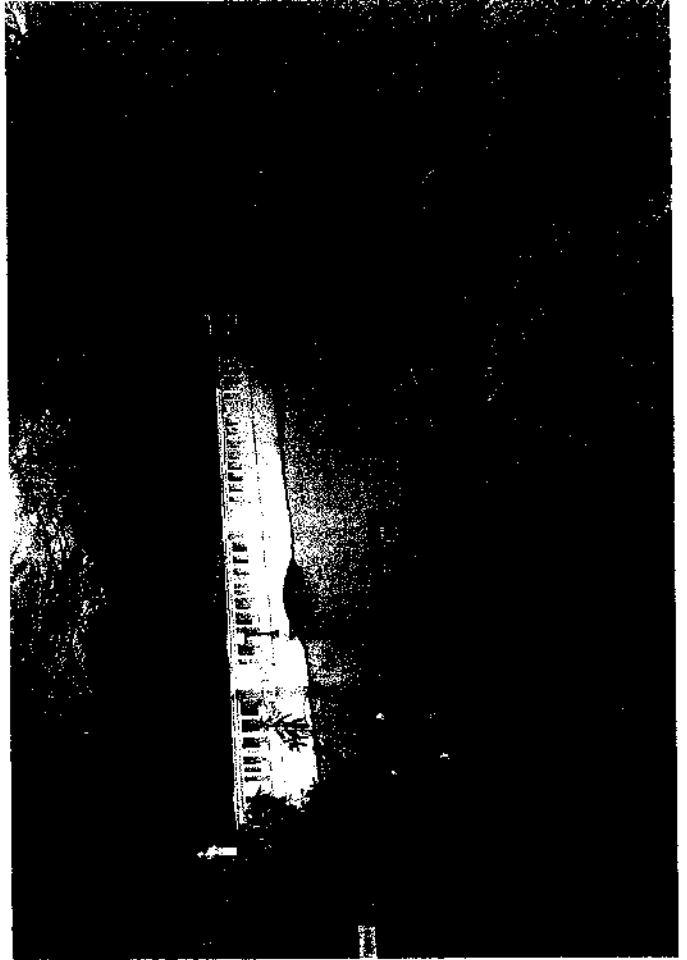
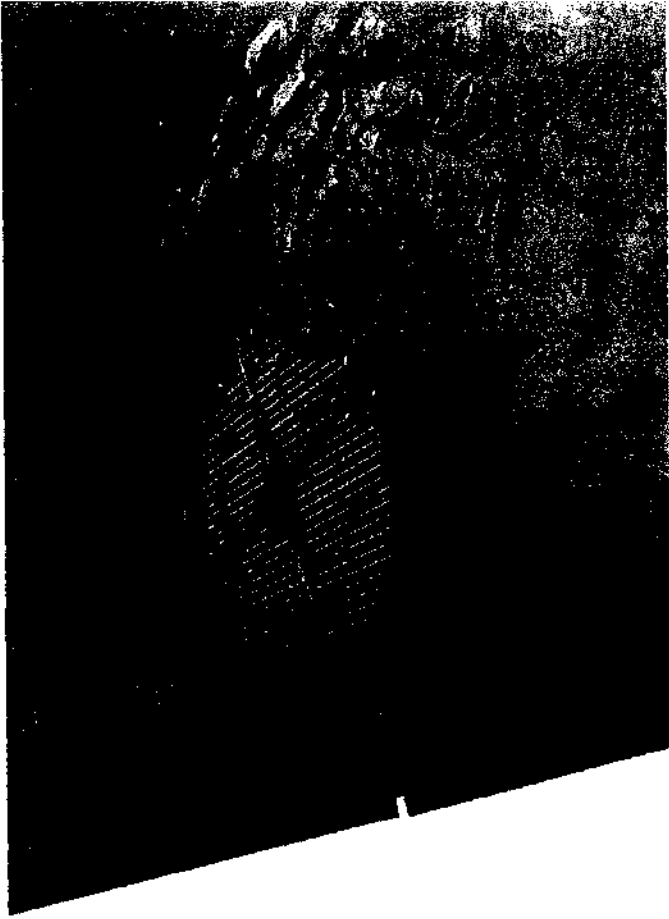


27 OCT 2008

NYMNP



NYM/PA
27 OCT 2008



27 OCT 2008

NYMNP

CoDa Structures

Consulting Civil & Structural Engineers
No. 2 Harewood Yard,
Harewood, Leeds
LS17 9LF

**RAITHWAITE HALL ESTATE, SANDSEND ROAD
WHITBY**

FLOODING & DRAINAGE STATEMENT

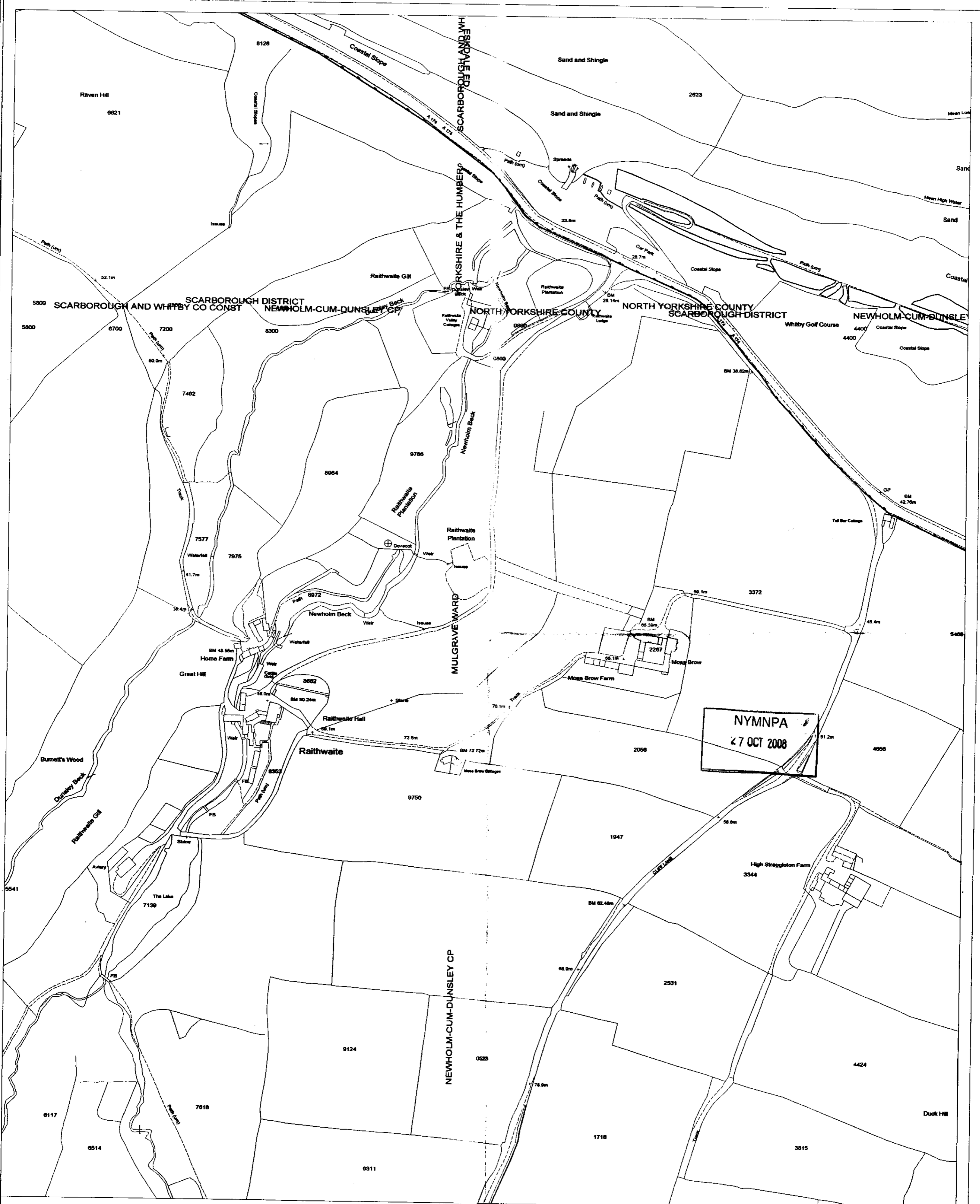
NYM / 2008 / 0 7 9 6 / F L


NYMNP

27 OCT 2008

APPENDIX G

EXTRACT FROM PUBLIC SEWER RECORD



460274 : 511334	Map Name : NZ0611SW	Title
	Yorkshire Water, PO Box 500, Haxby Road, Bradford BD9 2LZ	Notes
Joanna Wood Contact Tel :		Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trench Sewer = TD Partially Separate = PS
		<small>This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of discrepancies or other matters arise in the vicinity of public sewers. No houses or property boundaries are shown.</small>
	Date Req : 16/10/2007, 13:11:58	Date Gen : 16/10/2007, 13:12:15
	Source : Sewer Network Enquiry	