# FLOODING & DRAINAGE ASSESSMENT FOR LAND ADJACENT LIDGETT LANE, PILLEY

## CONTENTS:

1.0 INTRODUCTION
2.0 POLICY CONSIDERTIONS AND OBJECTIVES
3.0 FLOODING ISSUES
4.0 DRAINAGE
5.0 SUMMARY
6.0 CAVEATS

## APPENDICES:

APPENDIX A - SITE LOCATION PLAN (FIG. 1)
APPENDIX B - SITE TOPOGRAPHICAL SURVEY (FIG. 2)
APPENDIX C - SITE AERIAL PHOTOGRAPH
APPENDIX D - ENVIRONMENT AGENCY FLOOD MAP
APPENDIX E - CORRESPONDENCE FROM BARNSLEY METROPOLITAN DISTRICT COUNCIL - DRAINAGE
APPENDIX F - CORRESPONDENCE FROM YORKSHIRE WATER AND EXTRACT FROM THE PUBLIC SEWER RECORD
APPENDIX G - DRAINAGE CALCULATIONS
APPENDIX H - SCHEMATIC DRAINAGE Layout (FIG 4)

## 1.0 INTRODUCTION

1.01 Following instructions from JVH Planning on behalf of the Jaguar Estates Ltd and Wortley Construction Ltd on 07 March 2013, CoDA Structures have undertaken an assessment of flooding and drainage issues in relation to a potential residential development site adjacent Lidgett Lane, Pilley.

1.02 The site is currently farmland.

1.03 It is proposed to develop the site for approximately 35 houses.

1.04 The local authority is Barnsley Metropolitan District Council (BMDC).

## 2.0 POLICY CONSIDERATIONS AND OBJECTIVES

2.01 **National Planning Policy Framework:**

Section 10 of the National Planning Policy Framework (NPPF) published in March 2012 sets out Government policy on development and flood risk for England. It aims to ensure that flood risk is taken into account at all stages of the planning process, to avoid inappropriate developments in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is thought necessary in areas of flood risk, the NPPF aims to make it safe, without increasing flood risk elsewhere, and, where possible, reduce the overall flood risk.

The NPPF promotes a sequential risk-based approach to determine the suitability of land for development in flood risk areas. The broad aim of the NPPF is to reduce the number of people and properties within the natural and built environment at risk of flooding. To achieve this aim, planning authorities are required to ensure that flood risk is properly assessed during the initial planning stages of any development.

2.02 **Consideration and Objectives:**

This Flooding and Drainage Assessment Report will consider the following:-

- whether the proposed development is likely to be affected by flooding.
- whether the proposed development will increase flood risk to adjacent properties.

The report will also demonstrate that any existing flood risk or flood risk associated with the proposed development can satisfactorily managed. This will include:-

- whether the proposed development is likely to be affected by flooding and whether it will increase flood risk elsewhere.
- specifying the measures proposed to deal with the identified risks, including, where appropriate, proposals to reduce existing and/or future flood risk levels.

- satisfy the Local Authority that any flood risk to the development or additional risk arising from the proposal will be successfully managed so the site can be developed and occupied safely without risk to adjacent properties.

## 3.0 FLOODING ISSUES

### 3.01 The Site:

The site is located to the north of New Road and lies approximately 7.0 miles to the south of Barnsley Town Centre. A site location plan (Fig. 1) is attached in Appendix A.

The Ordnance Survey coordinates for the centre of the site are 433700mE and 400400mN.

The site area is approximately 2.4 hectares.

The general fall of the site is to the south. Site varies as follows:-

- north western corner 158.69m AOD
- north eastern corner 150.50m AOD
- south western corner 147.87m AOD
- south eastern corner 139.88m AOD

A site topographical survey is attached in Appendix B.

A site aerial photograph is attached in Appendix C.

The site is currently farmland.

No watercourses are believed to run through or lie in the immediate vicinity of the site.

From the inspection of OS maps watercourses lie in the vicinity of the site (within 500m) as follows:-

- drainage ditches 250m to the south
- un-named watercourse 250m to the west
- Birdwell Dike 360 m to the southeast

There are other water features in the vicinity of the site (within 500m) as follows:-

- small pond 200m to the south
- groundwater issues 350m to the southeast
- groundwater sinks 400m to the southeast

The position of the water courses and other features are indicated on the Site Location Plan (Fig. 1) attached in Appendix A and Environment Agency (EA) flood map attached in Appendix D.

3.02 **Flood Zone Classification:**

The site is located within Flood Zone 1 on the EA flood map. This zone comprises land assessed as having less than 1 in 1000 (<0.1%) annual probability of tidal or river flooding in any year.

A copy of the flood map (Fig.3) is attached in Appendix D.

3.03 **Sources of Flood Risk:**

The following table shows a summary of the forms of flood and the potential issues in relation to the site that require further assessment.

| Flood Source | Applicable | Comment |
|---|---|---|
| Fluvial | X | No watercourses lie in the vicinity. |
| Tidal | X | |
| Run Off | ✓ | Potential for run off from higher land to the northwest. |
| Groundwater | X | Relatively high groundwater levels are unlikely in this location. |
| Sewers | ✓ | A public foul sewer lies in Pilley Green adjacent the western boundary of the site. A public surface water sewer crosses the northwestern sector of the site and a public surface water sewer lies in Pilley Green adjacent the western boundary of the site. |
| Reservoirs, Lakes, Canals, etc. | X | There are no reservoirs or lakes in close proximity to the site. |

3.04 **Sequential Test:**

The Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding.

Table D.2 of the Technical Guidance to the NPPF (which categorises the flood risk vulnerability of land uses) indicates the proposed development is categorised as a 'more vulnerable' land use.

From the EA flood zone map site is identified as being Flood Zone 1.

Table D.3 of the Technical Guidance to the NPPF indicates where the proposed land use is 'more vulnerable' development is appropriate in Flood Zone 1. Therefore the Sequential Test has been passed.

3.05 **Exception Test**

Table D.3 of the Technical Guidance to the NPPF indicates where the proposed land use is 'more vulnerable' development is considered appropriate in Flood Zone 1 and the Exception Test is not required.

Notwithstanding the above the following sections of this report will demonstrate that the proposed development will be safe from flooding and will not increase flood risk elsewhere.

3.06 **Flood Risk Assessment:**

The site is within Flood Zone 1. This zone comprises land assessed as having less than a 1 in 1000 (<0.1%) annual probability of tidal or river flooding in any one year.

From the inspection of site levels and following a site walkover the site does not appear to be at risk from inundation of potential flood waters from surface water runoff from adjacent land. Whilst the land to the northwest is above the level of the site levels are such that any overland floodwaters would generally flow past the site to the east along Lidgett Lane or to the south along Pilley Green.

The effect of groundwater as a flood source is not considered to be an issue at this location.

From the inspection of site levels, the site does not appear to be at risk from flood waters from potential overloading of the public foul and/or surface sewer in Pilley Green as any such flood waters would generally flow past the site to the south along Pilley Green.

The site may be at risk from flood waters from potential overloading of the public surface water sewer which crosses the site.

3.07 **Effect of Development on the Wider Catchment:**

The proposed development will result in impermeable area on the site and therefore unattenuated surface water flows from the development, if not addressed, would increase the flood risk to the local catchment.

3.08 **Flood Risk Mitigation:**

The proposed development is in Flood Zone 1.

The site access should be designed such that any potential overland flood waters flowing along Lidgett Lane to the east do not enter the site.

The external levels around the development should be set to route any overland flood waters away/around the buildings to the south as the existing situation.

## 4.0 DRAINAGE

### 4.01 Public Sewers:

A 150mm diameter surface water sewer crosses the northwestern sector of the site

There is a 225mm diameter foul sewer and 225 diameter surface water sewer in Pilley Green adjacent the western boundary of the site.

There is a 150mm diameter foul and 225mm diameter surface water sewer in Silkstone Close to the south of the site.

Yorkshire Water have advised the following:-

Foul water can be discharged to the 300mm diameter combined sewer in New Road but it is assumed that foul water can be discharged to any of the foul or combined sewer adjacent the site.

The local Waste Water Treatment Works (WWTW) is Tankersley. It is understood this WWTW may only have limited space capacity, if any, available. A further response is awaited from Yorkshire Water.

If possible surface water should be discharged to soakaways or directly to watercourse.

The public sewer network does not have any capacity to accept any discharge of surface water from the development.

The correspondence from Yorkshire Water and a extract from the public sewer record are attached in Appendix F.

### 4.02 Existing Drainage:

It is not known whether there is a land drainage system on the site.

### 4.03 Foul Water:

It is proposed that a separate foul water drainage system should be provided on the development.

The following options for the discharge of foul water from the development can be considered:

Option 1 - Discharge to the 225mm diameter foul sewer in Pilley Green adjacent the western boundary of the site. However, whilst a gravity system can be adopted for the majority of the development a pumped system would be required for dwellings in the

southeastern sector.

Option 2 - Discharge to the 150mm diameter foul sewer in Silkstone Close to the south of the site. Whilst it is envisaged a gravity system can be adopted, a length of off-site sewer would be required which would need to be agree with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.

Option 3 - Discharge the 300mm diameter combined sewer in New Road to the southeast of the site. Whilst it is envisaged a gravity system can be adopted, a length of off-site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.

4.04 **Surface Water Drainage:**

A separate surface water drainage system should be provided on the development.

BGS Geological Sheet 87 Barnsley indicates the site is underlain with Pennine Middle Coal Measures and Sandstones may be present in the northeastern sector of the site so the use of soakaways on the development may be feasible.

The use of soakaways and porous paving will be considered on the development depending on ground conditions and the results of falling head permeability testing in accordance with BRE 363: Soakaways.

If soakaways prove not to be a feasible solution for the disposal of surface water from the development, it would be proposed to discharge surface water to Birdwell Dike to the south of the site at greenfield runoff to Birdwell Dike to the southeast of the site. BMDC-Drainage have advised that a discharge rate of 5.0 l/sec/ha should be adopted in this area. This would equate to a discharge of 2.4 x 5.0 = 12.0 l/sec for the development.

It would be proposed to provide stormwater storage on the development for a 1:100 year storm return period with an increase of 30% on rainfall intensity to cater for climate change.

The following options for the discharge of surface water from the development to Birdwell Dike can be considered:

Option 1 - Subject to agreement from Yorkshire Water, discharge surface water at 12.0 l/sec to the 225mm diameter surface water sewer in Pilley Green adjacent the western boundary of the site. However, whilst a gravity system with stormwater storage can be adopted for the majority of the development a pumped system with stormwater storage would be required for dwellings in the southwestern sector.

Option 2 - Subject to agreement from Yorkshire Water, discharge surface water at

12.0 l/sec to the 225mm diameter surface water sewer in Silkstone Close to the south of the site. Whilst it is envisaged a gravity system, with stormwater storage can be adopted in the development, a length of off site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.

Option 3 – Discharge surface water at 12.0 l/sec to the 600mm piped watercourse to the southeast of the site. Whilst it is envisaged a gravity system, with stormwater storage can be adopted on the development, a length of off site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.

The following initial estimation of stormwater storage requirements for the development has been based on the following:

| | |
|---|---|
| Proposed discharge rate: | 12.0 l/sec |
| New hardcover area: | 10,200 $m^2$ |
| Stormwater storage requirements: | 562.2 $m^3$ |

(Based on a 1:100 year storm return period and a 30% increase in rainfall intensity for climate change)

Stormwater storage calculations are attached in Appendix G.

4.05 **Recommendations:**

It is proposed that a separate foul water drainage system should be provided on the development discharging to either the public foul sewer in Pilley Green adjacent the site at Silkstone Close to the south of the site or the public combined sewer in New Road to the southwest of the site. If foul water is discharged to the foul sewer in Pilley Green adjacent the site a pumped system would be required for dwellings in the southeastern sector.

A separate surface water drainage system should be provided on the development.

BGS Geological Sheet 87 Barnsley indicates the site is underlain with Pennine Middle Coal Measures and Sandstones may be present in the northwestern sector of the site so the use of soakaways on the development may be feasible.

The use of soakaways and porous paving will be considered on the development depending on ground conditions and the results of falling head permeability testing in accordance with BRE 363: Soakaways.

If soakaways prove not to be a feasible solution on the site, it would be proposed to discharge surface water to Birdwell Dike to the southeast of the site at greenfield runoff. BMDC-Drainage have advised that a discharge rate of 5.0 l/sec/ha should be adopted in this area. This would equate to a discharge of 2.4 x 5.0 = 12.0 l/sec for the development.

Based on a proposed drained hardcover area of 10,200 $m^2$ and a discharge rate of 12.0 l/sec a storage volume of 562.2 $m^3$ should be provided on the site, based on a 1:100 year storm return period with a 30% increase on rainfall intensity to cater for climate change.

Due to the proposed development layout the storage is likely to be in the form of over sized pipes or culverts under the adopted highways.

A schematic drainage layout (Fig 4) based on Option 1 for both the foul and surface water is attached in Appendix H

## 5.0 SUMMARY

| | |
|---|---|
| **The Site** | The site is located to the north of New Road and lies approximately 7.0 miles to the south of Barnsley Town Centre.<br>The Ordnance Survey coordinates for the centre of the site are 433700mE and 400400mN.<br>The site area is approximately 2.4 hectares.<br>The general fall of the site is to the south. Site varies as follows:-<br>- north western corner 158.69m AOD<br>- north eastern corner 50.50m AOD<br>- south western corner 147.87m AOD<br>- south eastern corner 139.88m AOD<br>The site is currently farmland.<br>No watercourses are believed to run through or lie in the immediate vicinity of the site.<br>From the inspection of OS maps watercourses lie in the vicinity of the site (within 500m) as follows:-<br>- Birdwell Dike m to the southeast<br>- drainage ditches 250m to the southwest<br>- un-named watercourse 500m to the west<br>There are other water features in the vicinity of the site (within 500m) as follows:-<br>- groundwater issues 350m to the southeast<br>- groundwater sinks 400m to the southeast<br>- small pond 200m to the south |
| **Flooding Risk Assessment** | The site is within Flood Zone 1. This zone comprises land assessed as having less than a 1 in 1000 (<0.1%) annual probability of tidal or river flooding in any one year.<br>From the inspection of site levels and following a site walkover the site does not appear to be at risk from inundation of potential flood waters from surface water runoff from adjacent land. Whilst the land to the northwest is above the level of the site levels are such that any overland floodwaters would generally flow past the site to the east along Lidgett Lane or to the south along Pilley Green.<br>The effect of groundwater as a flood source is not considered to be an issue at this location.<br>From the inspection of site levels, the site does not appear to be at risk from flood waters from potential overloading of the public foul and/or surface sewer in Pilley Green as any such flood waters would generally flow past the site to the south along Pilley Green.<br>The site may be at risk from flood waters from potential overloading of the public surface water sewer which crosses the site. |
| **Sequential Test** | The Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding.<br>Table 2 of the Technical Guidance to the NPPF (which categorises the flood risk vulnerability of land uses) indicates the proposed development is categorised as a 'more vulnerable' land use.<br>From the EA flood zone map site is identified as being Flood Zone 1.<br>Table 3 of the Technical Guidance to the NPPF indicates where the proposed land use is 'more vulnerable' development is appropriate in Flood Zone 1. Therefore the Sequential Test has been passed. |
| **Exception Test** | Table 3 of the Technical Guidance to the NPPF indicates where the proposed land use is 'more vulnerable' development is considered appropriate in Flood Zone 1 and the Exception Test is not required.<br>Notwithstanding the above the following sections of this report will demonstrate that the proposed development will be safe from flooding and will not increase flood risk elsewhere |
| **Flood Risk Mitigation** | The proposed development is in Flood Zone 1.<br>The site access should be designed such that any potential overland flood waters flowing along Lidgett Lane to the east do not enter the site. |

| | |
|---|---|
| | The external levels around the development should be set to route any overland flood waters away/around the buildings to the south as the existing situation. |
| **Foul Drainage** | It is proposed that a separate foul water drainage system should be provided on the development.<br>The following options for the discharge of foul water from the development can be considered:<br>Option 1 - Discharge to the 225mm diameter foul sewer in Pilley Green adjacent the western boundary of the site. However, whilst a gravity system can be adopted for the majority of the development a pumped system would be required for dwellings in the southeastern sector.<br>Option 2 - Discharge to the 150mm diameter foul sewer in Silkstone Close to the south of the site. Whilst it is envisaged a gravity system can be adopted, a length of off-site sewer would be required which would need to be agree with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.<br>Option 3 - Discharge the 300mm diameter combined sewer in New Road to the southeast of the site. Whilst it is envisaged a gravity system can be adopted, a length of off-site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.<br>The local Waste Water Treatment Works (WWTW) is Tankersley. It is understood this WWTW may only have limited space capacity, if any, available. A further response is awaited from Yorkshire Water. |
| **Surface Water** | A separate surface water drainage system should be provided on the development.<br>BGS Geological Sheet 87 Barnsley indicates the site is underlain with Pennine Middle Coal Measures and Sandstones may be present under the majority of the site so the use of soakaways on the development may be feasible.<br>The use of soakaways and porous paving will be considered on the development depending on ground conditions and the results of falling head permeability testing in accordance with BRE 363: Soakaways.<br>If soakaways prove not to be a feasible solution on the site, it would be proposed to discharge surface water to Birdwell Dike to the southeast of the site at greenfield runoff. BMDC-Drainage have advised that a discharge rate of 5.0 l/sec/ha should be adopted in this area. This would equate to a discharge of 2.4 x 5.0 = 12.0 l/sec for the development. Based on a proposed drained hardcover area of 10,200 $m^2$ and a discharge rate of 12.0 l/sec<br>a storage volume of 562.2 $m^3$ should be provided on the site, based on a 1:100 year storm return period with a 30% increase on rainfall intensity to cater for climate change. Due to the proposed development layout the storage is likely to be in the form of over sized pipes or culverts under the adopted highways.<br>Option 1 - Subject to agreement from Yorkshire Water, discharge surface water at 12.0 l/sec to the 225mm diameter surface water sewer in Pilley Green adjacent the western boundary of the site. However, whilst a gravity system with stormwater storage can be adopted for the majority of the development a pumped system with stormwater storage would be required for dwellings in the southwestern sector.<br>Option 2 - Subject to agreement from Yorkshire Water, discharge surface water at 12.0 l/sec to the 225mm diameter surface water sewer in Silkstone Close to the south of the site. Whilst it is envisaged a gravity system, with stormwater storage can be adopted in the development, a length of off site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water.<br>Option 3 – Discharge surface water at 12.0 l/sec to the 600mm piped watercourse to the southeast of the site. Whilst it is envisaged a gravity system, with stormwater storage can be adopted on the development, a length of off site sewer would be required which would need to be agreed with the third party landowner or alternatively a sewer connection could be requisitioned through Yorkshire Water. |

## 6.0 CAVEATS

6.01 The comments given in this report and recommendations made are based on the information that could be obtained from reasonably accessible sources. Detailed discussions have not yet been held with statutory bodies and the local authority.

6.02 This report has been prepared for the sole use of Jaguar Estates Ltd and Wortley Construction Ltd and their development funders, unless agreed otherwise in writing by CoDA Structures.

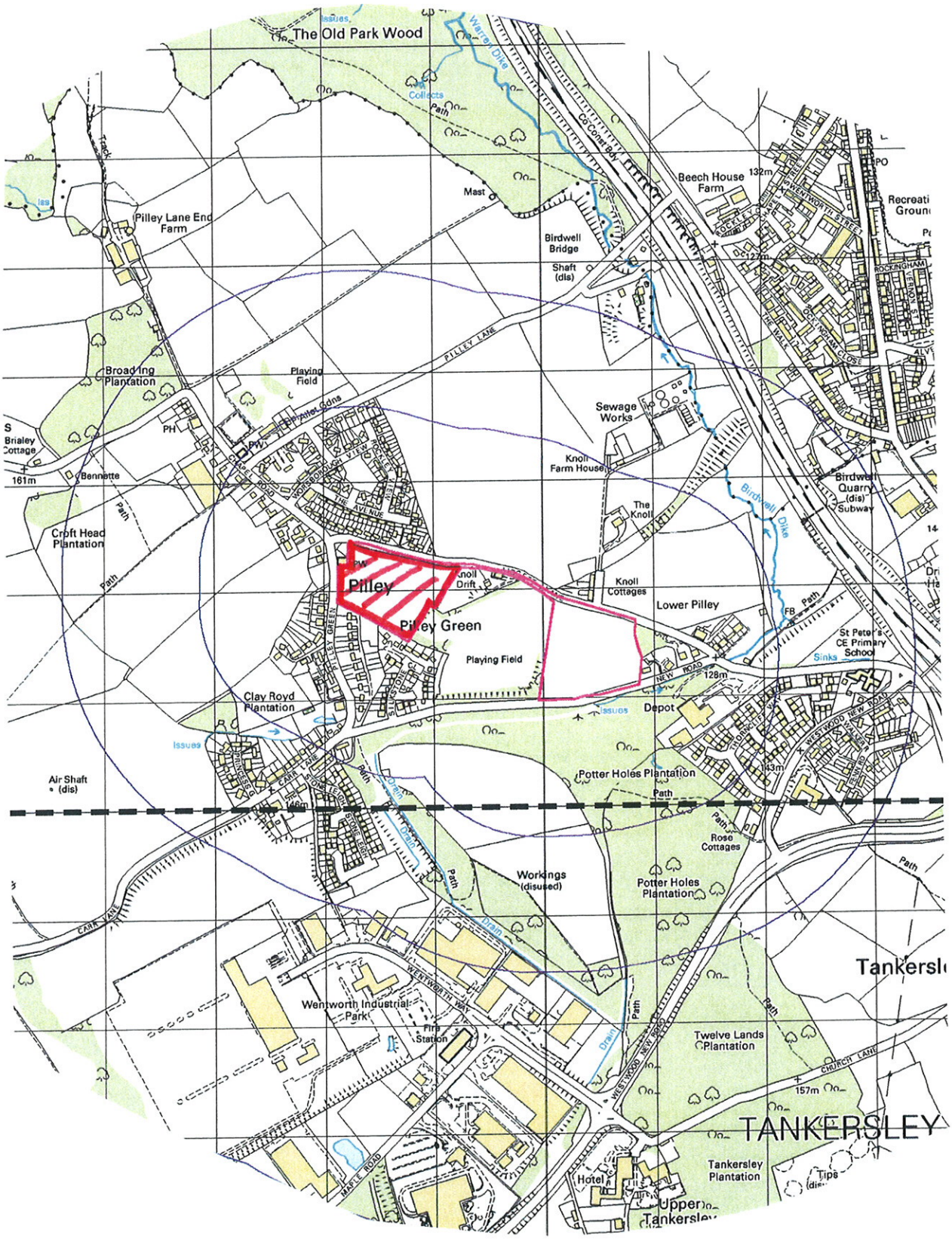
Signed: ..... Jan Lawrence .....
J Lawrence B Eng C Eng M I Struct E

# APPENDIX A

## SITE LOCATION PLAN (FIG. 1)

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

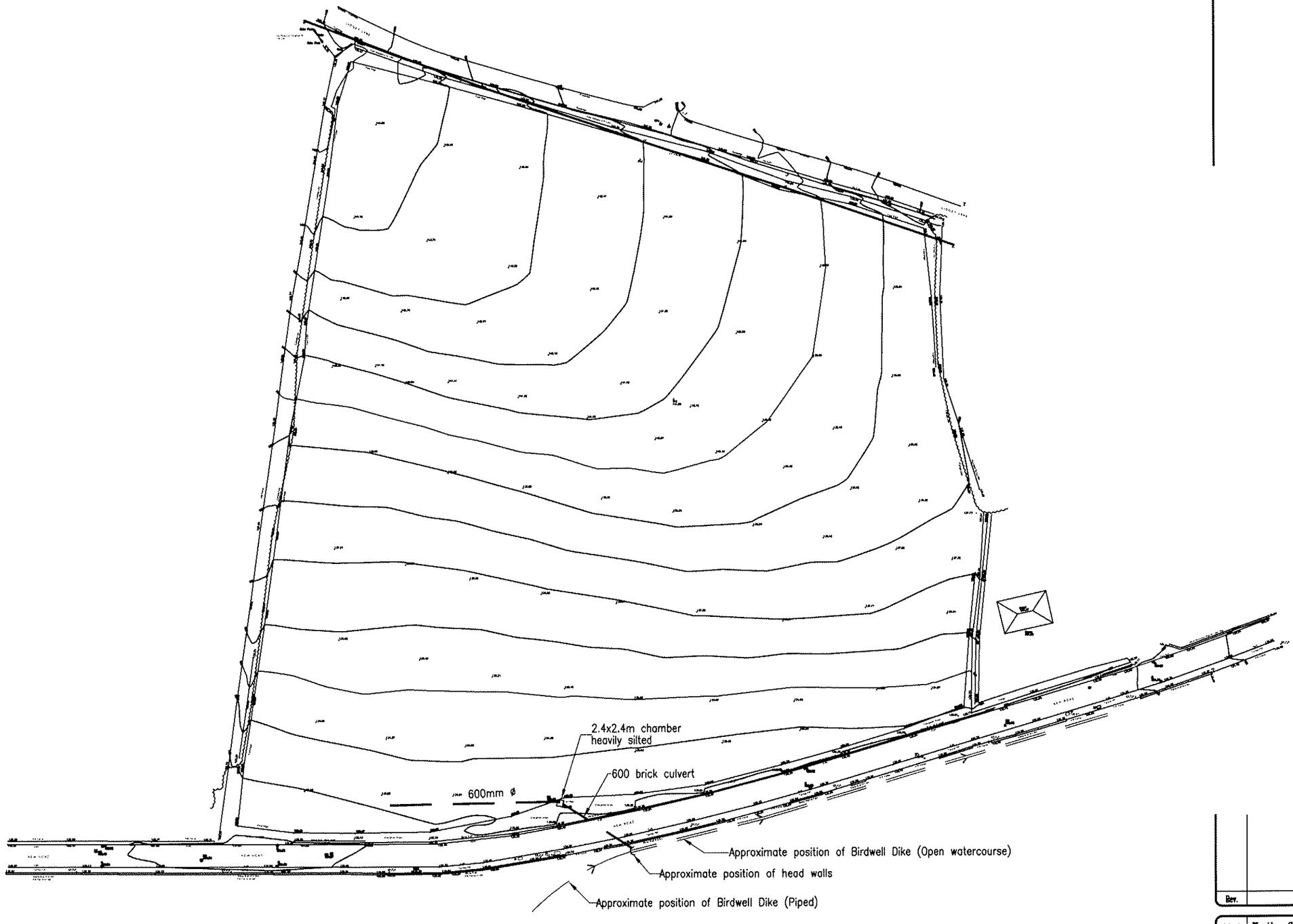
| | | | | | |
|---|---|---|---|---|---|
| Project | Lidgett Lane Pilley | | | | |
| Title | Site Location Plan | | | | |
| Drawn | JL | Date | 08.13 | Drg. No. | Rev. |
| Scale | 1:10000 | Checked | JL | 7217/Fig1 | - |



# APPENDIX B

## SITE TOPOGRAPHICAL SURVEY (FIG.2)

Notes




| Rev. | Content | Date |
|---|---|---|
| | | |

| | | | |
|---|---|---|---|
| Client | Wortley Group | | |
| Project | New Road, Pilley Green | | |
| Title | Site Topographical Survey | | |
| Drawn: RD | Date: 14.05.13 | Drg. No.: 7217/Fig2 | Rev.: – |
| Scale: 1:200 @A1 | Checked: JL | | |

CoDa+— Structures
Consulting Civil & Structural Engineers
14 Springfield Court
Guiseley
Leeds LS20 8PD
Tel: 01943 872567
Fax: 01943 870824

# APPENDIX C

## SITE AERIAL PHOTOGRAPH

**CoDa *Structures***
Consulting Civil & Structural Engineers
14 Springfield Court
GUISELEY
Leeds LS20 8FD

# SITE PHOTOGRAPHS
# LIDGETT LANE, PILLEY

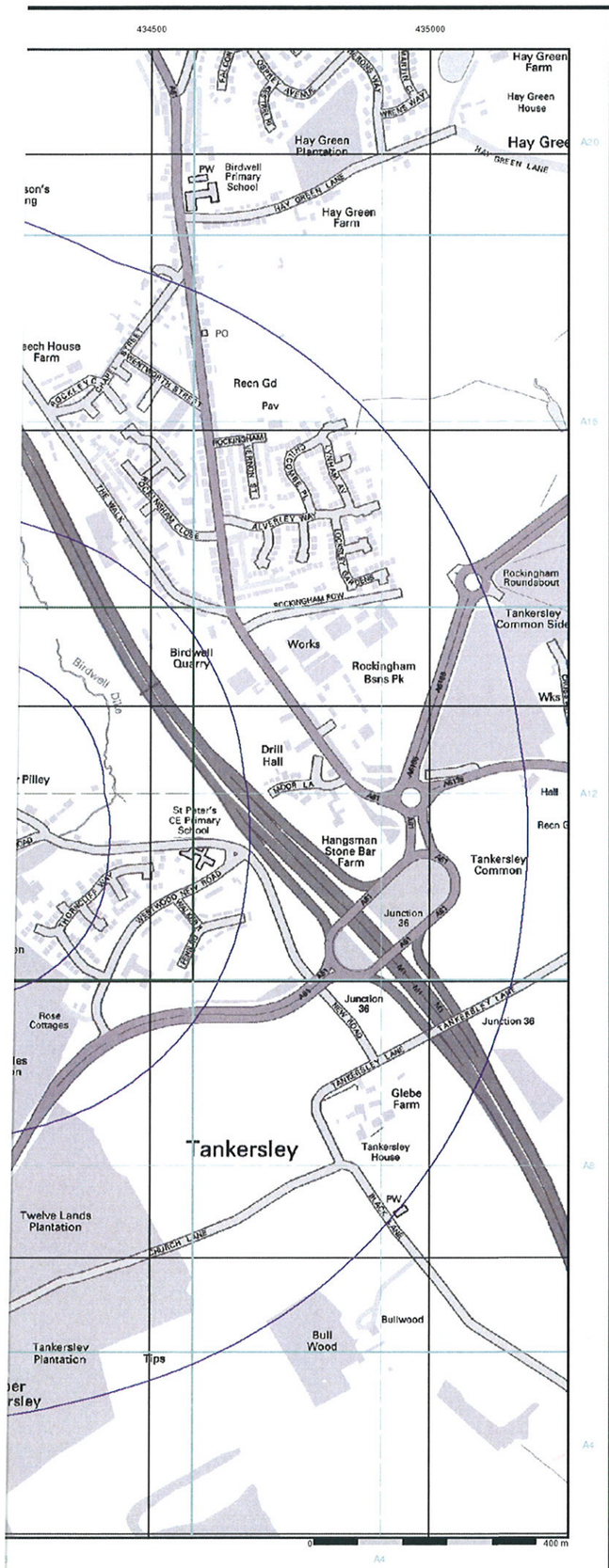
1. Site aerial photograph.

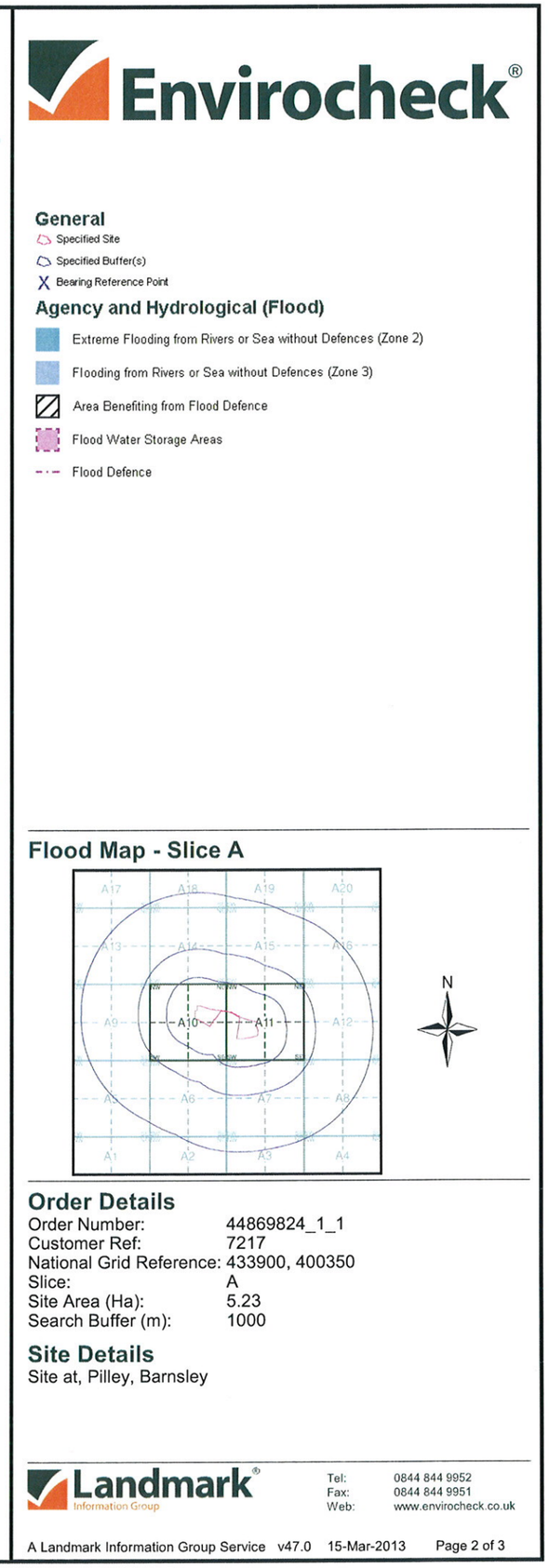
# APPENDIX D

## ENVIRONMENT AGENCY FLOOD MAP

# APPENDIX D

## ENVIRONMENT AGENCY FLOOD MAP



# APPENDIX E

## CORRESPONDENCE FROM BARNSLEY METROPOLITAN DISTRICT COUNCIL - DRAINAGE

## Jon Lawrence

**From:** Atkins , Wayne [WayneAtkins@barnsley.gov.uk]
**Sent:** 24 April 2013 12:01
**To:** Jon Lawrence
**Cc:** Bell , Derek; Tiggardine , Paul
**Subject:** RE: Possible Residential sites at Pilley

Jon

Just to let you know I have just taken up a new post as Principal Engineer Highway Management, unfortunately I therefore will no longer carry out drainage related works. The first contact regarding drainage at the authority is now Derek Bell (tel: 01226 787654) who will now deal with these matters.

Regarding this site I would advise you of the following:

I am unaware of any culverted watercourses running through your site, the developer will need to carry out the relevant surveys to ascertain the location of any watercourses within the site boundary.

Birdwell Dike is an ordinary watercourse for the purposes of the Land Drainage Act, 1991, and is in riparian ownership. The developer would have to cross third party land to connect to this watercourse. The watercourse may require some clearance works downstream to accommodate the flows from the site. This can be agreed when more definite proposals are submitted.

If this watercourse is chosen by the developer as a point of discharge for surface water from the site the developer's attention is drawn to the following:

There should be no increase in surface water runoff from the new development. PPS25 recognises that the management of flood risk is not simply restricted to flood plains and that a catchment-wide approach should be employed.

if a new connection to a watercourse is proposed, then flows must be attenuated to a maximum of 5 litres/second/hectare.

Any balancing facility should be designed to accommodate a 1 in 30 year flow from the site below ground and a 1 in 100 year flow retained within the site (including an allowance of 30% for climate change), without causing any flooding to buildings.

There are alternatives to conventional storage for the control of surface water run-off that are favoured by the authority where ground conditions are suitable. Sustainable Urban Drainage techniques (SUD's) tackle surface water run-off problems at source using features such as soakaways, permeable pavements, grassed swales, infiltration trenches, ponds and wetlands to attenuate flood peak flows, produce water quality improvements and environmental enhancements.

The authority seeks to promote the use of SUD's techniques to this site and the authority expects the developer of the site to submit detailed investigations such that the use of SUD's has been fully explored.

New Road has been prone to flooding in the past during times of heavy rainfall, the developer must take this into account in his flood risk assessment regarding access and egress from the site in times of storm.

If you require any further information please contact Derek Bell on 01226 787654

Regards

Wayne Atkins
Principal Engineer – Highway Management

Barnsley Metropolitan Borough Council
Environmental Services
Network Resilience and Asset Management
Westgate Plaza 1
PO Box 603
S70 9FA
Telephone: 01226 772182
Fax: 01226 772196
E-mail: wayneatkins@barnsley.gov.uk

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**From:** Jon Lawrence [mailto:JonLawrence@constructiondesign.co.uk]
**Sent:** 17 April 2013 12:43
**To:** Atkins , Wayne
**Subject:** Possible Residential sites at Pilley

HI Wayne

Further to our conversation of a couple of weeks ago please find attached plans showing the site we are looking at for possible residential development.
I would be grateful for any advise, particularly on Birdwell Beck and any culverted watercourses that may lie on or in the vicinity of the sites
We will consider soakways for the disposal of surface water but in the event of ground conditions not being suitable we would propose to discharge to Birdwell Beck. We would limit the discharge to Birdwell Beck to greenfield runoff [I would suggest 5.0 l/s/ha would seem appropriate for this location] and provide storage for storms up to 1:100 + 30% increase on rainfall intensity for climate change.
I understand that New Road is prone to flooding in heavy rainfall but would this be detrimental to the development of the site?
I look forward to hearing from you

Regads
Jon

**CoDA Structures**
**14 Springfield Court**
**Guiseley**
**Leeds**
**LS20 8FD**

**T: 01943 872567**
**M: 07970 713448**
**F: 01943 870824**
**E:** jonlawrence@constructiondesign.co.uk
**W:** www.constructiondesign.co.uk

# APPENDIX F

## CORRESPONDENCE FROM YORKSHIRE WATER AND EXTRACT FROM THE PUBLIC SEWER RECORD

YorkshireWater

| JOB No. | / |
|---|---|
| JL | : |
| : | : |
| RECEIVED 10 APR 2013 | |
| REPLIED | |
| COPY TO | DATE |
| | |
| | |

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0845 120 8482
Fax: (01274) 372 834

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

Coda Structures LTD
14 Springfield Court
Guiseley
Leeds
LS20 8FD

FAO:- J Lawrence

Your Ref: 7217/1.04/JL/lt
Our Ref: P003727

8th April 2013

Dear Sir,

**Lidgett Lane, Pilley - Pre-Planning Sewerage Enquiry on P011898**

Thank you for your letter received 19th March 2013 and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map, this indicates the recorded position of the public sewers.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site:

There are small diameter public sewers recorded crossing the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2000.

The local Waste Water Treatment Works (WWTW) is Tankersley. It is understood that this WWTW may only have limited spare capacity, if any, available. We have contacted the respective treatment team for more information regarding the impact of proposed development and will contact you when an assessment has been made.

Development of the site should take place with separate systems for foul and surface water drainage. The separate system should extend to the public sewer.

Foul water domestic waste should discharge to the 300 mm diameter public foul/combined sewer recorded in New Road, at a point adjacent to the site.

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SUDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SUDS in this instance from the appropriate authorities.

Where appropriate, soakaways, swales and infiltration trenches (SUDS) may be adopted as part of the public sewer network. Further information may be seen in the DEFRA publication 'Interim Code of Practice for Sustainable Drainage Systems' (ISBN 0-86017-904-4). If the developer is considering adoption of SUDS they should contact our Developer Services Team on 0845 120 84 82.

The local public sewer network does not have capacity to accept any discharge of surface water from the proposal site. The developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse for discharge.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

It is understood that watercourses is located through/adjacent to the site. These appear to be the obvious place for surface water disposal.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0845 120 84 82) for further information.

The public sewer network is for domestic sewage purposes. This generally means foul water for domestic purposes and, where a suitable surface water or combined sewer is available, surface water from the roofs of buildings together with surface water from paved areas of land appurtenant to those buildings. Land and highway drainage have no right of connection to the public sewer network. No land drainage to be connected/discharged to public sewer.

As a last resort, highway drainage may be accepted under certain circumstances. If it can be demonstrated, through satisfactory evidence, that SUDS are not a viable option, there are no watercourses or highway drains available and if capacity is available within the public sewer network, highway drainage discharges to the public sewer network may be permitted. In this event, the developer may be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0845 120 84 82.

All the above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours faithfully

Developer Services Team

Pilley Fm House
GP
Pilley Fm Bungalow
Pilley Mission Church
154.5m
154.8m
LIDGET LANE
152.1m
Knoll Drift
149.4m
Pilley Green
PILLEY GREEN
143.0m
SILKSTONE CLOSE
Track
139.9m
Harriet House
Pond
Shelter
GP
TCB
138.7m
140.5m
2.67m deep
NEW ROAD
P

UPN: Undefined Originator: K KHAN, New Development - Waste Water,

# APPENDIX G

## DRAINAGE CALCULATIONS

**CoDa *Structures***
Consulting Civil & Structural Engineers
No. 14 Springfield Court,
Guiseley, Leeds
LS20 8FD

**PILLEY, BARNSLEY (WESTERN SITE)**
**DRAFT SURFACE WATER STORAGE CALCULATIONS**

## DESIGN SYNOPSIS

Storage has been designed to accommodate the design flows of a 1 in 100 year Return Period storm event + 30% for climatic change, with a pass forward flow of no greater than 12.0 lt/sec for drainage run-off from the proposed impermeable areas limited to calculated 'Green-field' run-off rates.

This demonstrates the requirement for an on-site storage volume of 562.2$m^3$.

## CONTENTS

1. Design Synopsis and Contents

2. Source Control 12.0lt/sec – 1 in 100 year +30% CC Return Period Summary of Results 1/2

3. Source Control 12.0lt/sec – 1 in 100 year +30% CC Return Period Summary of Results 2/2

4. Source Control 12.0lt/sec – 1 in 100 year +30% CC Return Period Rainfall Details

5. Source Control 12.0lt/sec – 1 in 100 year +30% CC Return Period Notional Storage Structure and Outflow Control Details

## Summary of Results for 100 year Return Period (+30%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Control (l/s) | Max Overflow (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|
| 15 min Summer | 10.659 | 0.659 | 9.4 | 0.0 | 9.4 | 208.3 | O K |
| 30 min Summer | 10.836 | 0.836 | 9.4 | 0.0 | 9.4 | 283.5 | O K |
| 60 min Summer | 11.022 | 1.022 | 10.0 | 0.0 | 10.0 | 362.6 | O K |
| 120 min Summer | 11.191 | 1.191 | 10.7 | 0.0 | 10.7 | 434.0 | O K |
| 180 min Summer | 11.258 | 1.258 | 11.0 | 0.0 | 11.0 | 462.7 | O K |
| 240 min Summer | 11.289 | 1.289 | 11.1 | 0.0 | 11.1 | 475.7 | O K |
| 360 min Summer | 11.302 | 1.302 | 11.2 | 0.0 | 11.2 | 481.3 | O K |
| 480 min Summer | 11.296 | 1.296 | 11.2 | 0.0 | 11.2 | 478.6 | O K |
| 600 min Summer | 11.283 | 1.283 | 11.1 | 0.0 | 11.1 | 473.2 | O K |
| 720 min Summer | 11.268 | 1.268 | 11.0 | 0.0 | 11.0 | 466.8 | O K |
| 960 min Summer | 11.235 | 1.235 | 10.9 | 0.0 | 10.9 | 452.7 | O K |
| 1440 min Summer | 11.163 | 1.163 | 10.6 | 0.0 | 10.6 | 422.4 | O K |
| 2160 min Summer | 11.053 | 1.053 | 10.1 | 0.0 | 10.1 | 375.6 | O K |
| 2880 min Summer | 10.945 | 0.945 | 9.7 | 0.0 | 9.7 | 330.0 | O K |
| 4320 min Summer | 10.749 | 0.749 | 9.4 | 0.0 | 9.4 | 246.6 | O K |
| 5760 min Summer | 10.570 | 0.570 | 9.4 | 0.0 | 9.4 | 170.9 | O K |
| 7200 min Summer | 10.412 | 0.412 | 9.4 | 0.0 | 9.4 | 104.2 | O K |
| 8640 min Summer | 10.306 | 0.306 | 9.4 | 0.0 | 9.4 | 61.1 | O K |
| 10080 min Summer | 10.244 | 0.244 | 9.2 | 0.0 | 9.2 | 38.3 | O K |
| 15 min Winter | 10.720 | 0.720 | 9.4 | 0.0 | 9.4 | 234.4 | O K |
| 30 min Winter | 10.921 | 0.921 | 9.6 | 0.0 | 9.6 | 319.6 | O K |
| 60 min Winter | 11.134 | 1.134 | 10.5 | 0.0 | 10.5 | 410.0 | O K |
| 120 min Winter | 11.333 | 1.333 | 11.3 | 0.0 | 11.3 | 494.2 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Overflow Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|---|
| 15 min Summer | 116.002 | 0.0 | 217.9 | 0.0 | 22 |
| 30 min Summer | 79.998 | 0.0 | 300.6 | 0.0 | 37 |
| 60 min Summer | 52.662 | 0.0 | 395.8 | 0.0 | 66 |
| 120 min Summer | 33.322 | 0.0 | 500.8 | 0.0 | 124 |
| 180 min Summer | 24.998 | 0.0 | 563.6 | 0.0 | 182 |
| 240 min Summer | 20.313 | 0.0 | 610.6 | 0.0 | 242 |
| 360 min Summer | 15.144 | 0.0 | 682.8 | 0.0 | 340 |
| 480 min Summer | 12.271 | 0.0 | 737.7 | 0.0 | 398 |
| 600 min Summer | 10.413 | 0.0 | 782.5 | 0.0 | 462 |
| 720 min Summer | 9.099 | 0.0 | 820.5 | 0.0 | 526 |
| 960 min Summer | 7.345 | 0.0 | 883.2 | 0.0 | 664 |
| 1440 min Summer | 5.419 | 0.0 | 977.4 | 0.0 | 942 |
| 2160 min Summer | 3.986 | 0.0 | 1078.4 | 0.0 | 1360 |
| 2880 min Summer | 3.200 | 0.0 | 1154.5 | 0.0 | 1760 |
| 4320 min Summer | 2.349 | 0.0 | 1271.0 | 0.0 | 2552 |
| 5760 min Summer | 1.888 | 0.0 | 1362.2 | 0.0 | 3288 |
| 7200 min Summer | 1.594 | 0.0 | 1437.9 | 0.0 | 3960 |
| 8640 min Summer | 1.389 | 0.0 | 1503.4 | 0.0 | 4576 |
| 10080 min Summer | 1.237 | 0.0 | 1561.7 | 0.0 | 5240 |
| 15 min Winter | 116.002 | 0.0 | 244.1 | 0.0 | 22 |
| 30 min Winter | 79.998 | 0.0 | 336.7 | 0.0 | 36 |
| 60 min Winter | 52.662 | 0.0 | 443.2 | 0.0 | 64 |
| 120 min Winter | 33.322 | 0.0 | 560.9 | 0.0 | 122 |

## Summary of Results for 100 year Return Period (+30%)

| | Storm Event | Max Level (m) | Max Depth (m) | Max Control (l/s) | Max Overflow (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 180 | min Winter | 11.420 | 1.420 | 11.7 | 0.0 | 11.7 | 530.4 | O K |
| 240 | min Winter | 11.465 | 1.465 | 11.9 | 0.0 | 11.9 | 548.8 | O K |
| 360 | min Winter | 11.498 | 1.498 | 12.0 | 0.0 | 12.0 | 562.2 | O K |
| 480 | min Winter | 11.490 | 1.490 | 12.0 | 0.0 | 12.0 | 558.9 | O K |
| 600 | min Winter | 11.472 | 1.472 | 11.9 | 0.0 | 11.9 | 551.7 | O K |
| 720 | min Winter | 11.452 | 1.452 | 11.8 | 0.0 | 11.8 | 543.5 | O K |
| 960 | min Winter | 11.401 | 1.401 | 11.6 | 0.0 | 11.6 | 522.8 | O K |
| 1440 | min Winter | 11.290 | 1.290 | 11.1 | 0.0 | 11.1 | 475.8 | O K |
| 2160 | min Winter | 11.119 | 1.119 | 10.4 | 0.0 | 10.4 | 403.8 | O K |
| 2880 | min Winter | 10.957 | 0.957 | 9.7 | 0.0 | 9.7 | 335.1 | O K |
| 4320 | min Winter | 10.656 | 0.656 | 9.4 | 0.0 | 9.4 | 207.3 | O K |
| 5760 | min Winter | 10.364 | 0.364 | 9.4 | 0.0 | 9.4 | 84.3 | O K |
| 7200 | min Winter | 10.226 | 0.226 | 9.1 | 0.0 | 9.1 | 32.9 | O K |
| 8640 | min Winter | 10.181 | 0.181 | 8.2 | 0.0 | 8.2 | 20.9 | O K |
| 10080 | min Winter | 10.158 | 0.158 | 7.3 | 0.0 | 7.3 | 16.0 | O K |

| | Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Overflow Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|---|---|
| 180 | min Winter | 24.998 | 0.0 | 631.2 | 0.0 | 180 |
| 240 | min Winter | 20.313 | 0.0 | 683.9 | 0.0 | 236 |
| 360 | min Winter | 15.144 | 0.0 | 764.5 | 0.0 | 346 |
| 480 | min Winter | 12.271 | 0.0 | 826.3 | 0.0 | 448 |
| 600 | min Winter | 10.413 | 0.0 | 876.4 | 0.0 | 482 |
| 720 | min Winter | 9.099 | 0.0 | 919.0 | 0.0 | 558 |
| 960 | min Winter | 7.345 | 0.0 | 989.2 | 0.0 | 714 |
| 1440 | min Winter | 5.419 | 0.0 | 1094.7 | 0.0 | 1022 |
| 2160 | min Winter | 3.986 | 0.0 | 1207.9 | 0.0 | 1456 |
| 2880 | min Winter | 3.200 | 0.0 | 1293.0 | 0.0 | 1880 |
| 4320 | min Winter | 2.349 | 0.0 | 1423.5 | 0.0 | 2720 |
| 5760 | min Winter | 1.888 | 0.0 | 1525.7 | 0.0 | 3296 |
| 7200 | min Winter | 1.594 | 0.0 | 1610.4 | 0.0 | 3816 |
| 8640 | min Winter | 1.389 | 0.0 | 1683.8 | 0.0 | 4408 |
| 10080 | min Winter | 1.237 | 0.0 | 1749.2 | 0.0 | 5144 |

## Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Winter Storms | Yes |
| Return Period (years) | 100 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 |
| Ratio R | 0.300 | Longest Storm (mins) | 10080 |
| Summer Storms | Yes | Climate Change % | +30 |

## Time Area Diagram

Total Area (ha) 1.002

| Time (mins) From: | To: | Area (ha) | Time (mins) From: | To: | Area (ha) |
|---|---|---|---|---|---|
| 0 | 4 | 0.501 | 4 | 8 | 0.501 |

## Model Details

Storage is Online Cover Level (m) 13.000

## Double Pipe Structure

Diameter (m) Conduit Section Length (m) 78.250
Slope (1:X) 1000.000 Invert Level (m) 10.000

Section Number 20 Minor Dimn (mm) 1500 4 * Hyd Radius (mm) 2.006
Conduit Type {} Side Slope (Deg) 90.0 XSect Area (m²) 3.949
Major Dimn (mm) 2700 Corner Splay (mm) 225

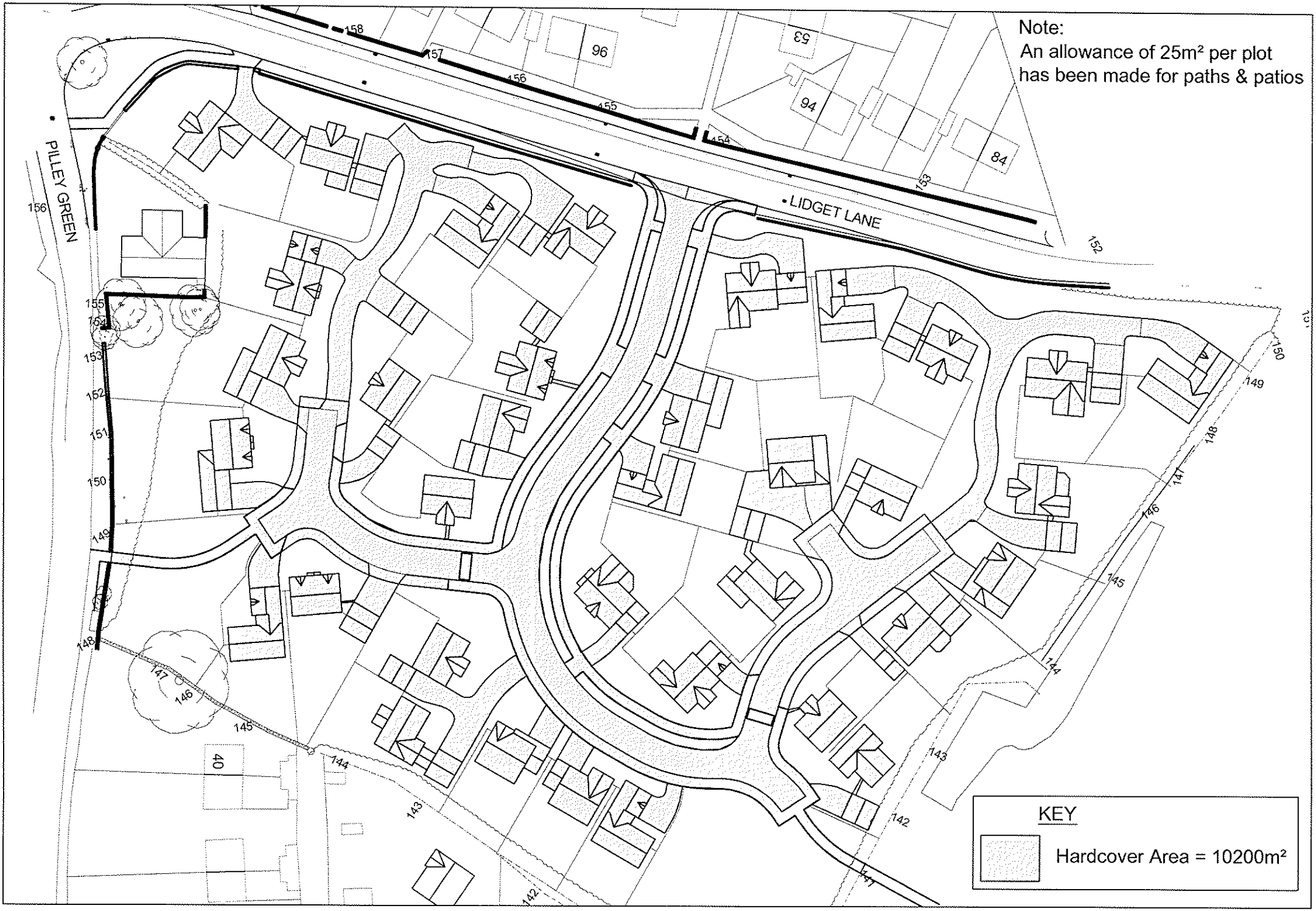
## Hydro-Brake® Outflow Control

Design Head (m) 1.500 Hydro-Brake® Type Md6 SW Only Invert Level (m) 10.000
Design Flow (l/s) 12.0 Diameter (mm) 131

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 4.3 | 1.200 | 10.8 | 3.000 | 17.0 | 7.000 | 25.9 |
| 0.200 | 8.7 | 1.400 | 11.6 | 3.500 | 18.3 | 7.500 | 26.8 |
| 0.300 | 9.4 | 1.600 | 12.4 | 4.000 | 19.6 | 8.000 | 27.7 |
| 0.400 | 9.0 | 1.800 | 13.1 | 4.500 | 20.8 | 8.500 | 28.5 |
| 0.500 | 8.7 | 2.000 | 13.8 | 5.000 | 21.9 | 9.000 | 29.4 |
| 0.600 | 8.6 | 2.200 | 14.5 | 5.500 | 23.0 | 9.500 | 30.2 |
| 0.800 | 9.1 | 2.400 | 15.2 | 6.000 | 24.0 | | |
| 1.000 | 9.9 | 2.600 | 15.8 | 6.500 | 25.0 | | |

## Weir Overflow Control

Discharge Coef 0.544 Width (m) 2.400 Invert Level (m) 11.500


Note:
An allowance of 25m² per plot has been made for paths & patios
PILLEY GREEN
LIDGET LANE
KEY
Hardcover Area = 10200m²

# APPENDIX H

## SCHEMATIC DRAINAGE LAYOUT (FIG 4)