Flood Risk Assessment

12501429

Carlton Road, Barnsley

12501429-GHD-C-2001-P02

A

REVISION HISTORY

Rev	Date	Author	Check	Apprv	Description of Changes
P01	20.03.2018	NT	VB	VB CEng MICE	
P01	31.01.2019	NT	VB	VB CEng MICE	UPDATED TO SUIT LATEST LAYOUT

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1 INTRODUCTION

This Site-Specific Flood Risk Assessment (FRA) and Drainage Strategy has been prepared for the proposed residential development at Carlton Road, Barnsley. The assessment investigates the potential flood risk impacts of the proposed development in accordance with the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance. This FRA is considered proportionate to the degree of flood risk and to the scale, nature and location of the development. This FRA has been prepared in accordance with non-statutory technical standards for sustainable drainage, published March 2015 and NPPF climate change allowances, published February 2016.

2 THE SITE

2.1 Site Location

The site is located close to Carlton Road, Barnsley and is located between St. Helen's boulevard, St. Helen's avenue and Carlton Road to the south of Springwell Academy. The site is accessed from St. Helen's Boulevard.

The site location is described below:

- Post Code S71 2AY
- OS X (Eastings) 435813
- OS Y (Northings) 408622
- Nat. Grid SE358086

The site location is illustrated in Figure 1 below.

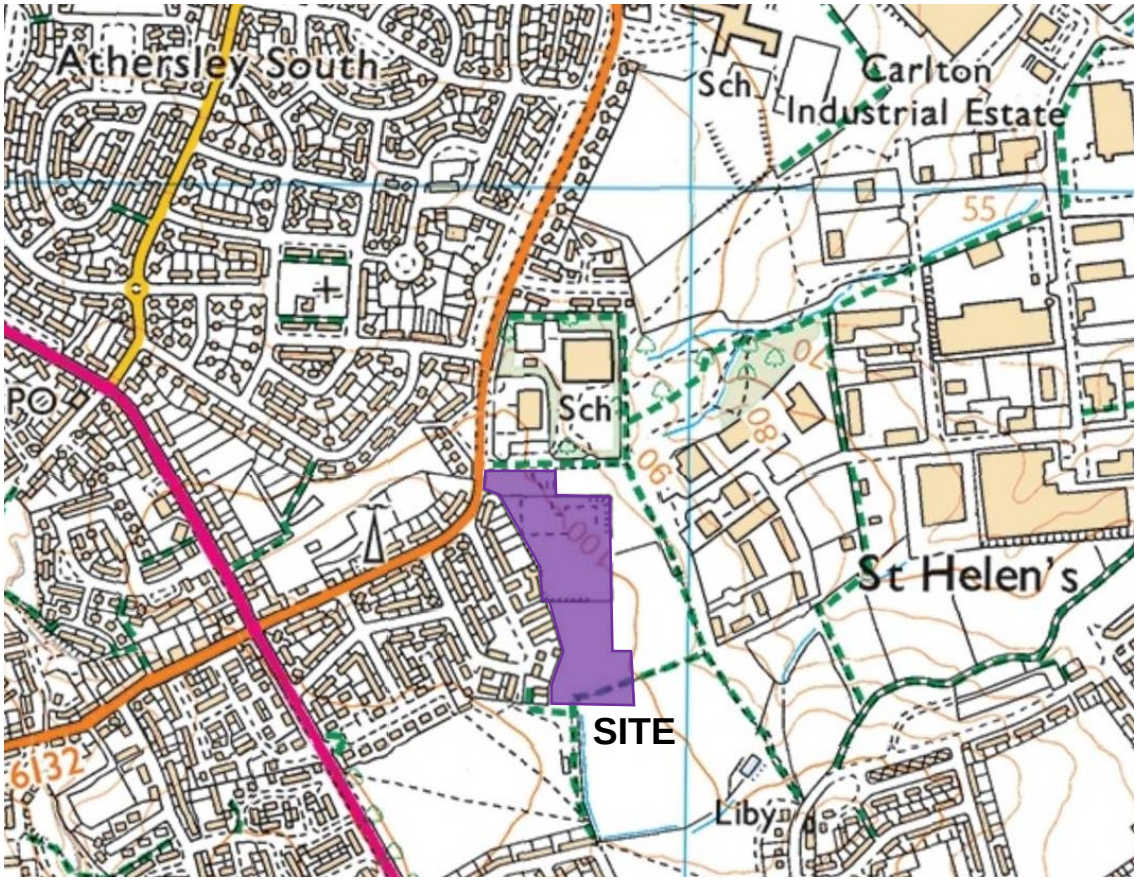

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Figure 1: Site Location Plan

2.2 Site Description

The site is located at the site of a former school and partly on arable land. Approximately 0.38ha of the site was impermeable area associated with the school, the rest is open grassland and arable land.

The site is approximately 2.8ha and currently consists of the former school site to the north and farmland to the south.

Appendix A shows a topographical survey of the site. The topographical survey shows that the site generally falls from SW to NE with the southern part of the site falling to the southeast. Ground levels varying on site between approximately 97.5mAOD and 103mAOD.

2.3 Proposed Development

The planning application proposes the construction of 101 residential properties along with associated hardstanding and public highways continuing from St. Helen's boulevard. The proposed layout is contained within Appendix B.

3 SUITABILITY OF DEVELOPMENT PROPOSALS

3.1 Flood Risk Vulnerability

The Flood Risk Vulnerability Classification has been determined in accordance with Planning Practice Guidance, Flood Risk and Coastal Change. For multi-occupancy sites, the Flood Risk Vulnerability should be based upon the most vulnerable part of the site. The Flood Risk Vulnerability Classification is 'More Vulnerable'. This classification includes *'Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels'*.

3.2 Flood Zone Compatibility

The Flood Zone Compatibility has been reviewed in accordance with Planning Practice Guidance, Flood Risk and Coastal Change, paragraph 067.

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted

Table 1: Flood Risk Vulnerability and Flood Zone Compatibility

The site is located entirely within Flood Zone 1. The vulnerability classification is 'More Vulnerable'. The scheme proposals are therefore considered appropriate accordance with Planning Practice Guidance.

4 SOURCES OF FLOODING

4.1 Flood Map for Planning (Rivers and Sea)

Fluvial flooding occurs when high flows exceed the capacity of the river channel and spill out onto the floodplain, usually after a period of prolonged or heavy rainfall.

The Environment Agency Flood Map for Planning (rivers and sea) is shown in Figure 3. The site is located within Flood Zone 1, which comprises land assessed as having '*a less than 1 in 1,000 annual probability of river or sea flooding*'.

The flood zone is based upon the 'undefended' scenario. This is judged to be a precautionary scenario.

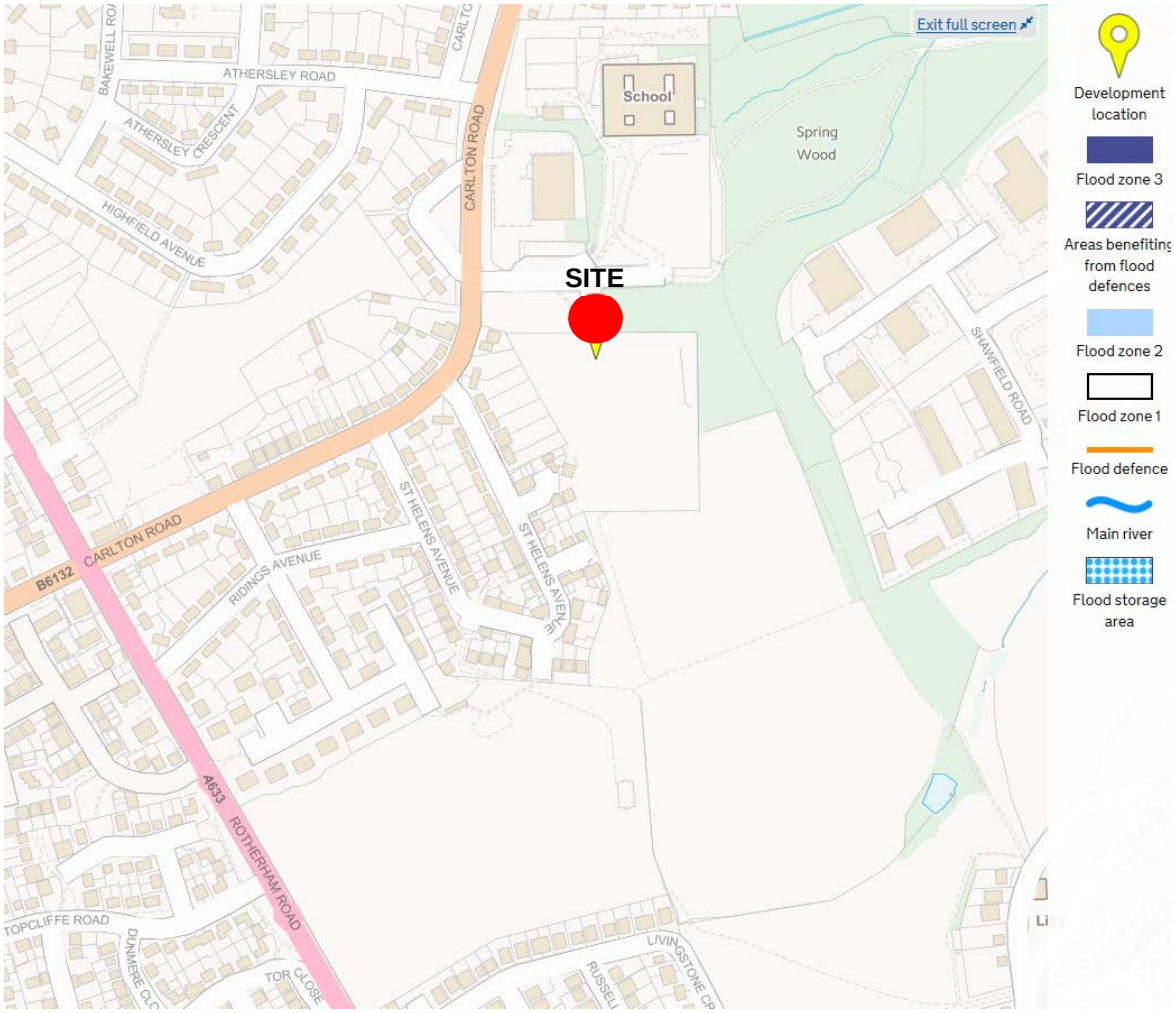

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Figure 3: Environment Agency Flood Map for Planning (Rivers and Sea)

4.2 Flooding from Land (Pluvial Flooding)

The Environment Agency Flood Map showing Risk of Flooding from Surface Water is shown in Figure 4. This type of flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

The map indicates that the site has a 'Vey low' chance of flooding from surface water. This indicates a probability of flooding less than 1 in 1000 years. The map is not definitive and is based on the best information available to the Environment Agency, such as ground levels and drainage.

The proposed development will be designed to manage surface water runoff. Overland flow routing will be incorporated during detailed design. An overland flow routing strategy can be seen in appendix C.

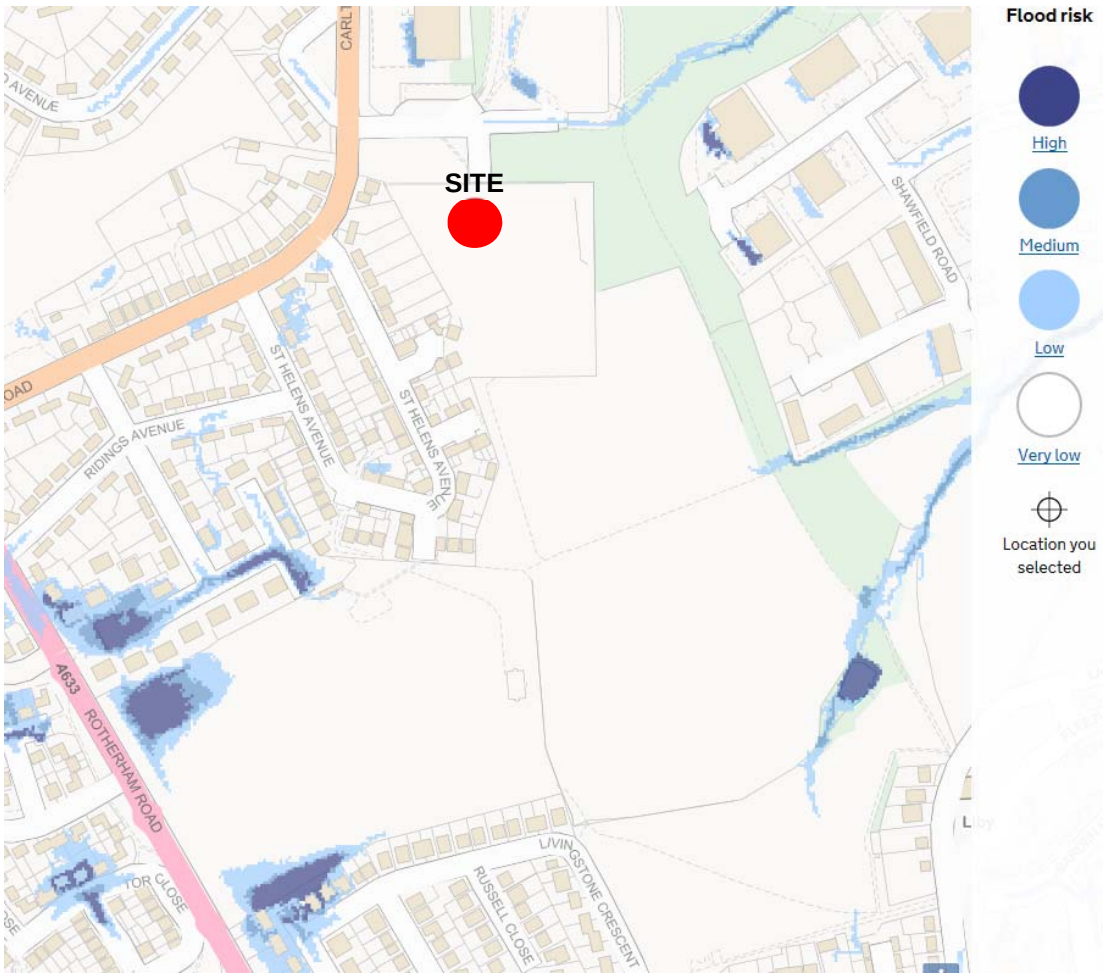

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Figure 4: Risk of Flooding from Surface Water

The site has been surveyed to provide a more accurate assessment of the existing site levels. The site topographical survey is contained within Appendix A.

4.3 Flooding from Groundwater

Groundwater flooding occurs when water levels in the ground rise above surface levels and is more likely to occur in low lying areas. The ground investigation report contained within Appendix D, indicates the site is underlain by stiff gravelly clay. The site investigation also found that groundwater is likely at depth in the bedrock. As such the risk of flooding from groundwater is considered to be low.

4.4 Flooding from Sewers

Yorkshire Water sewer records contained within Appendix E, indicate that the sewer on Oak Head Close is at a higher level than this site. Should the sewer on Oak head road flood, the floodwaters would flow onto the site. However, the overland flood routing strategy has been designed to keep overland flow with in the adopted highway before discharging to the public open space on site. The proposed flood routing strategy can be found in Appendix D.

4.5 Flooding from Reservoirs

Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensure that reservoirs are inspected regularly and essential safety work is carried out.

However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning.

The Environment Agency Flood Map showing Risk of Flooding from Reservoirs is shown in Figure 5.

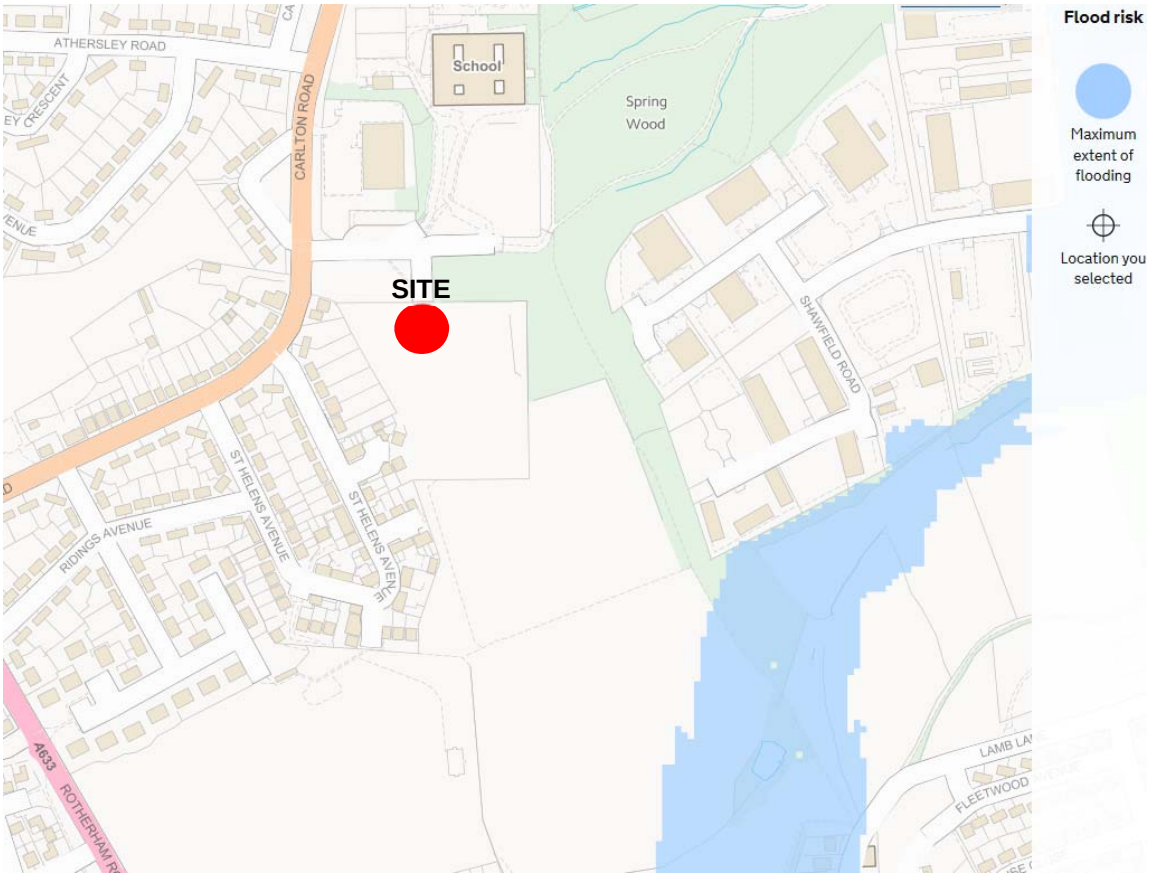

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Figure 5: Risk of Flooding from Reservoirs

The Environment Agency Data illustrates that the site is located within an area that would not be affected by reservoir failure.

5 DRAINAGE STRATEGY

5.1 Hierarchy of Techniques

In accordance with NPPF, the following hierarchy of surface water drainage options has been considered:

- Discharge into the ground (infiltration)
- Discharge to a surface water body
- Discharge to a surface water sewer, highway drain, or another drainage system
- Discharge to a combined sewer

In accordance with current policy, infiltration has been considered as the preferred method of surface water disposal. The ground investigation shows that the site is largely underlain by cohesive soils which tend to be of low permeability. The report also indicates pockets of made ground underlay the site. Infiltration testing undertaken by LITHOS confirms that infiltration is not a viable option in this instance. The site investigation can be seen in Appendix D.

Opportunities for discharge to watercourse have been considered. The site is located approximately 150m from an undesignated watercourse to the northeast. As the site is not riparian discharge of surface water to watercourse is not considered viable.

Surface water flows from the new development will be discharged to the existing public surface water sewer in St. Helen's Boulevard subject to section 106 of the Water Industry Act. The surface water system will accommodate flows on-site up to and including the 1 in 100 year critical duration event, with an allowance for climate change. A total storage capacity of approximately 530 m^3 will be provided and the system will have a flow control device limiting surface water discharge to 25 l/s. The proposed discharge rate will provide a 30% betterment on the run-off from the impermeable areas associated with the former school. The surface water network will be designed in accordance with BS EN 752 and 'sewers for adoption' 6th edition.

Foul water flows from the new development will be collected by a dedicated gravity foul network designed in accordance with BS EN 752 and 'sewers for adoption' 6th edition, before being pumped into the existing foul public sewer in Oak Head Close subject to agreement under Section 106 of the Water Industry Act.

It is proposed that both surface and foul water networks, where appropriate, are offered for adoption to the sewerage undertaker under Section 104 of the water Industry Act 1991. The proposed drainage strategy can be seen in Appendix B.

5.2 Climate Change

The drainage strategy will include an increase in the storm intensity of 40%, which is consistent with the effects of climate change for a development with a design life of 100 years, as outlined in NPPF.

5.3 Consultation

Prior to the planning application process, the Lead Local Flood Authority (LLFA) and Sewerage Undertaker have been consulted and the correspondence is contained within appendix F.

Barnsley Metropolitan Borough Council (BMBC) as LLFA and Yorkshire Water as the Stautory Undertaker were presented with the following information:

- Exsiting topographical Survey
- CCTV survey information
- Brownfield run-off estimation
- Proposed drainage layout
- Proposed drainage calculations

BMBC have confirmed their acceptance of the proposed drainage strategy (See Appendix F).

Consultation with Yorkshire water has been ongoing since the concept stage of design. Yorkshire water confirmed at a meeting on 16th March 2018 that they were happy in principle with the site being considered as brownfield and the proposed discharge rate being based on a 30% betterment on the existing condition. Yorkshire water have confirmed there acceptance of the proposed strategy (See Appendix F).

6 CONCLUSIONS

The planning application proposes the construction of 101 residential properties at the site of a former school at Carlton Road, Barnsley.

The residential development is situated within Flood Zone 1 and is considered appropriate under Planning Practice Guidance.

The site is not at risk of surface water flooding. Overland flood flow routing will be considered during detailed design.

The site is not considered to be at risk of flooding from reservoirs.

Surface water flows from the new development will be discharged to the existing public surface water sewer in St. Helen's Boulevard subject to section 106 of the Water Industry Act. The surface water system will accommodate flows on-site up to and including the 1 in 100 year critical duration event, with an allowance for climate change.

Foul water flows will be collected by a dedicated gravity foul network designed in accordance with BS EN 752 and 'sewers for adoption' 6th edition, before being pumped into the existing public foul sewer, subject to section 106 of the Water Industry Act.

Yorkshire Water and Barnsley Metropolitan Borough Council have been consulted throughout the pre-planning stages and have confirmed their acceptance of the proposed drainage strategy.

Appendices

7 APPENDIX A TOPOGRAPHICAL SURVEY

Haycock+Todd

SITE SURVEY

CARLTON ROAD
ST HELENS BOULEVARD
BARNSLEY

Sheet 1 of 1

Drawn by: DR

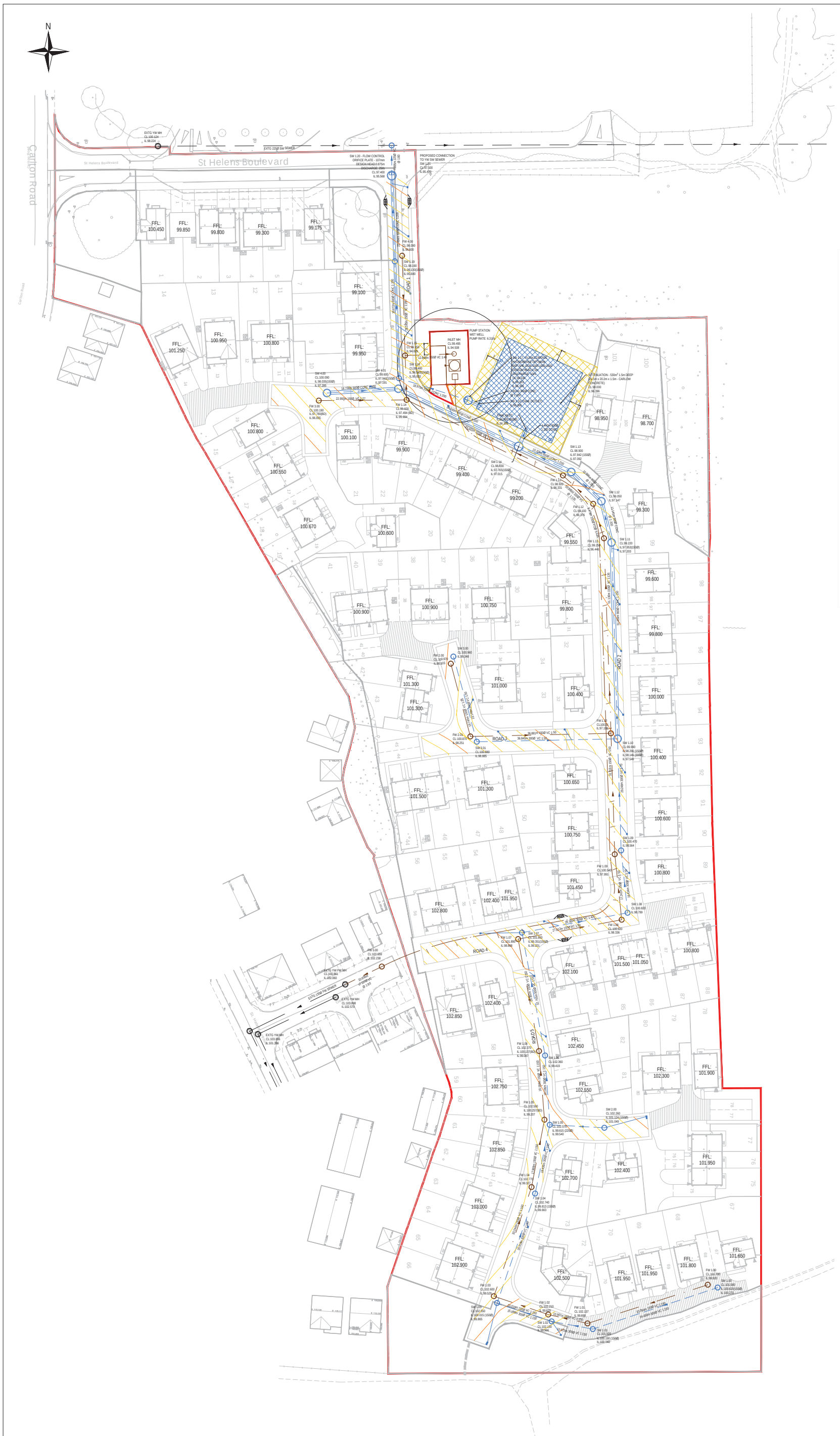
Date: 1/2/2020

Scale: 1:1000

Survey No.: S8860

NOTES

8 APPENDIX B PROPOSED LAYOUT AND DRAINAGE STRATEGY



NOTES

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2. THIS DRAWING IS FOR INFORMATION ONLY.

KEY

- SITE BOUNDARY
- EXISTING SW SEWER
- EXISTING FW SEWER
- PROPOSED SW
- PROPOSED FW
- PROPOSED FW RISING MAIN
- EASEMENT
- 0.5m CONTOUR
- 0.1m CONTOUR

No.	Revision	Drawn	Job Manager	Project Director	Date
P02	UPDATED TO SUIT LATEST LAYOUT	JS	NT	VB	01.02.19
P01	PRELIMINARY ISSUE FOR PLANNING	NT	VB	VB	19.03.18

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T 44 (0)113 487 8600
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Client **KEEPMOAT HOMES**

Project **CARLTON ROAD, BARNSLEY**

Title **ENGINEERING LAYOUT**

Scale	1:500 A1	**DO NOT SCALE**	
Drawn	NT	Designer	NT
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Date

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Original Size **A1**

Rev. **P02**

PRELIMINARY

9 APPENDIX C FLOOD ROUTING PLAN

YW REF: H-3-264-041

KEY

- SITE BOUNDARY
- PRIMARY OVERLAND FLOW ROUTE
- FLOODING FROM SEWERS OVERLAND FLOW ROUTE
- MAJOR CONTOUR (0.5m)
- MINOR CONTOUR (0.1m)

PRELIMINARY

GENERAL NOTES

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P03	LAYOUT UPDATED	TCP	VB	VB	25.01.19
P02	UPDATED LAYOUT	DC	NT	VB	04.04.18
P01	PRELIMINARY ISSUE FOR COMMENT	DC	NT	VB	10.01.18

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Alexandra House, Lawnswood Business Park,
Leeds, LS16 6QY, United Kingdom
T 44 (0)113 487 8600
E UKmail@ghd.com **W** www.ghd.com

Client **KEEPMOAT HOMES**

Project **CARLTON ROAD, BARNSLEY**

Title **FLOOD ROUTING PLAN**

Scale	1:500 @ A1	**DO NOT SCALE**	
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Drafting Check	NT	Design Check	NT
Approved (Project Director)			
Date			

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Rev. **P03**

10 APPENDIX D GROUND INVESTIGATION

LITHOS

Land at Carlton Road, Barnsley

For Keepmoat Homes Yorkshire & Barnsley Metropolitan Borough Council

Report no: 2551/1

Date: July 2017

Tel: 01937 545330 • info@lithos.co.uk • www.lithos.co.uk

SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	2551	**Site area/ha**	3.2ha
Client:	Keepmoat Homes Yorkshire & Barnsley Metropolitan Borough Council	**NGR:**	SE 358 084
Site:	Carlton Road, Barnsley	**Nearest postcode:**	S71 2AY

The site is located off St Helen's Boulevard, approximately 2.5km north-east of Barnsley town centre, and currently comprises an open grassed field, a demolished former school and open arable land.

Lithos were commissioned by Keepmoat & BMBC to provide a geoenvironmental appraisal of the site. It is understood that the site is to be redeveloped with housing. Lithos' investigation included a review of the site's history and environmental setting and a ground investigation comprising 15 trial pits and 13 dynamic sample boreholes.

A summary of salient geoenvironmental issues is provided in the Table below.

Issue	Remarks
Made ground	The thickest made ground is typically restricted to the north east of the site and predominantly comprises reworked natural clay. More variable made ground, comprising a mixture of made ground topsoil, demolition rubble, burnt red shale, sub-base and granular made ground is typically restricted to the area around former school buildings.
Natural ground	The site is underlain by topsoil over cohesive residual soil (stiff gravelly clay), with bedrock (sandstone, mudstone or siltstone) typically within 2m of the surface.
Contamination	No significant contamination has been identified.
Mining & quarrying	The site is in a Coal Authority low risk area. No issues have been identified at the site.
Hazardous gas	There are two landfills within 250m, as well as deep made ground on the site. A programme of 9 monitoring visits over 6 months is underway. The site is in an area where 3-5% of homes are estimated to be above the radon action level.
Preparatory works	Site clearance and topsoil strip. Made Ground (within the exception of Re-worked Clay) should be blinded by 300mm clean topsoil within gardens/landscaped areas.
Foundations	The vast majority of proposed dwellings will be founded on strip foundations at a minimum depth of 900mm, over-deepened where necessary due to tree influence and/or significant thicknesses of made ground. Based on the current layout, plots 103 and 104 are likely to require trench-fill foundations of greater than 2.5m depth which will require engineering-design.
Groundwater & excavations	No significant inflows of groundwater were encountered during this investigation. Shallow excavations should remain stable during the construction phase in the short term.
Flooding & drainage	The site is located in Flood Zone 1. Soakaways will not provide a suitable means for surface water disposal at the site.
Highways	Natural soils should provide a CBR of 2.5%. Deep made ground will need replacing with suitable aggregate or re-engineering to a specification to be agreed with the adopting authority.

A second phase of works is anticipated in arable land in the south of the site post-harvest (likely in September 2017).

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

11 APPENDIX F CONSULTATION

From: Atkins , Wayne [mailto:WayneAtkins@barnsley.gov.uk]
Sent: 11 January 2018 10:09
To: Nick Turner <Nick.Turner@ghd.com>
Cc: Victoria Brayshaw <Victoria.Brayshaw@ghd.com>
Subject: RE: Development at Carlton road, Barnsley

HI Nick,

The proposed drainage strategy would be acceptable to Barnsley MBC as Lead Local Flood Authority. However, as it is proposed to connect to the Public Sewer system I would suggest contacting Yorkshire Water to confirm allowable discharge rates into their system prior to carrying out any detailed design work.

If you need any further information please let me know.

Regards

Wayne Atkins
Principal Engineer – Drainage
Environment & Transport
Place Directorate
Barnsley Metropolitan Borough Council

Telephone: 01226 772182
E-mail: wayneatkins@barnsley.gov.uk

From: Nick Turner [mailto:Nick.Turner@ghd.com]
Sent: 10 January 2018 10:49
To: Atkins , Wayne
Cc: Victoria Brayshaw
Subject: Development at Carlton road, Barnsley

Hi Wayne,

Further to our conversation, please find attached our proposed drainage strategy and supporting information for the proposed 98 property residential development at Carlton Road, Barnsley.

Please could you let us know whether our proposal would be acceptable?

Kind Regards,

Nick Turner
Civil Engineer

GHD
T: +44 (0)113 487 8600 | E: Nick.Turner@ghd.com
Alexandra House, Lawnswood Business Park, Leeds, LS16 6QY, UK | www.ghd.com

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Nick Turner

From: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Sent: 19 March 2018 17:06
To: Nick Turner
Subject: Carlton Road, Barnsley - R507905

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Nick,

I will agree to 25 l/s maximum.

Kind Regards

Chris Roberts
Sewerage Technician
Yorkshire Water

*** Please note, all correspondence must be sent to technical.sewerage@yorkshirewater.co.uk and will be responded to within 10 working days ***

From: Nick Turner [mailto:Nick.Turner@ghd.com]
Sent: 16 March 2018 13:47
To: Chris Roberts <Chris.Roberts@yorkshirewater.co.uk>
Cc: Chris Cammidge <Christopher.Cammidge@keepmoat.com>; andrew.bradley@keepmoat.com; Victoria Brayshaw <Victoria.Brayshaw@ghd.com>
Subject: Carlton Road, Barnsley

EXTERNAL SOURCE - THINK BEFORE YOU CLICK

Hi Chris,

Further to our earlier meeting we have looked at updating the calculations regarding the discharge rate for Carlton Road, Barnsley.

As discussed we have discounted the impermeable area from the playground but included the outbuilding shown to the northeast of the main school building as shown below.

This gives an impermeable area discharging to the existing public sewer of 2726m^2. Using modified rational method this area gives an existing discharge of 37.9l/s. We propose to provide 30% betterment on the existing condition.

Our proposed surface water discharge rate to the public sewer in St Helens Blvd is therefore 27l/s

Are you able to confirm that you are satisfied that the above proposals are acceptable to Yorkshire Water?

Kind Regards,

Nick Turner
Civil Engineer

GHD
T: +44 (0)113 487 8600 | E: Nick.Turner@ghd.com
Alexandra House, Lawnswood Business Park, Leeds, LS16 6QY, UK | www.ghd.com

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YorkshireWater

Mr C Cammidge
Keepmoat Homes Yorkshire
Callflex Business Park
Golden Smithies Lane
Wath Upon Dearne
Rotherham
S63 7ER

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

Tel: 0345 120 8482
Fax: (01274) 372 834

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref: KHY003
Our Ref: T004431

27th March 2017

Dear Mr Cammidge,

Carlton Road, Barnsley - Pre-planning sewerage enquiry on R507905 - Residential

Thank you for your recent enquiry. Our charge of £152.00 (plus VAT) will be added to your account with us, reference KHY003. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months.

Existing Infrastructure

(Please note:- due to the change in legislation on 01/10/2011 there may be public sewers within the site boundary which is not recorded on the Statutory Sewer Map the presence of which should be taken into account in the design of the scheme)

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul water domestic waste should discharge to the 150 mm diameter public foul sewer recorded in Oak Head Road, at a point to the south west of the site.

Surface Water

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.

YorkshireWater

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

Other Observations

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 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

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 0345 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.

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.

YorkshireWater

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 sincerely

Chris Roberts
Sewerage Technician
Developer Services

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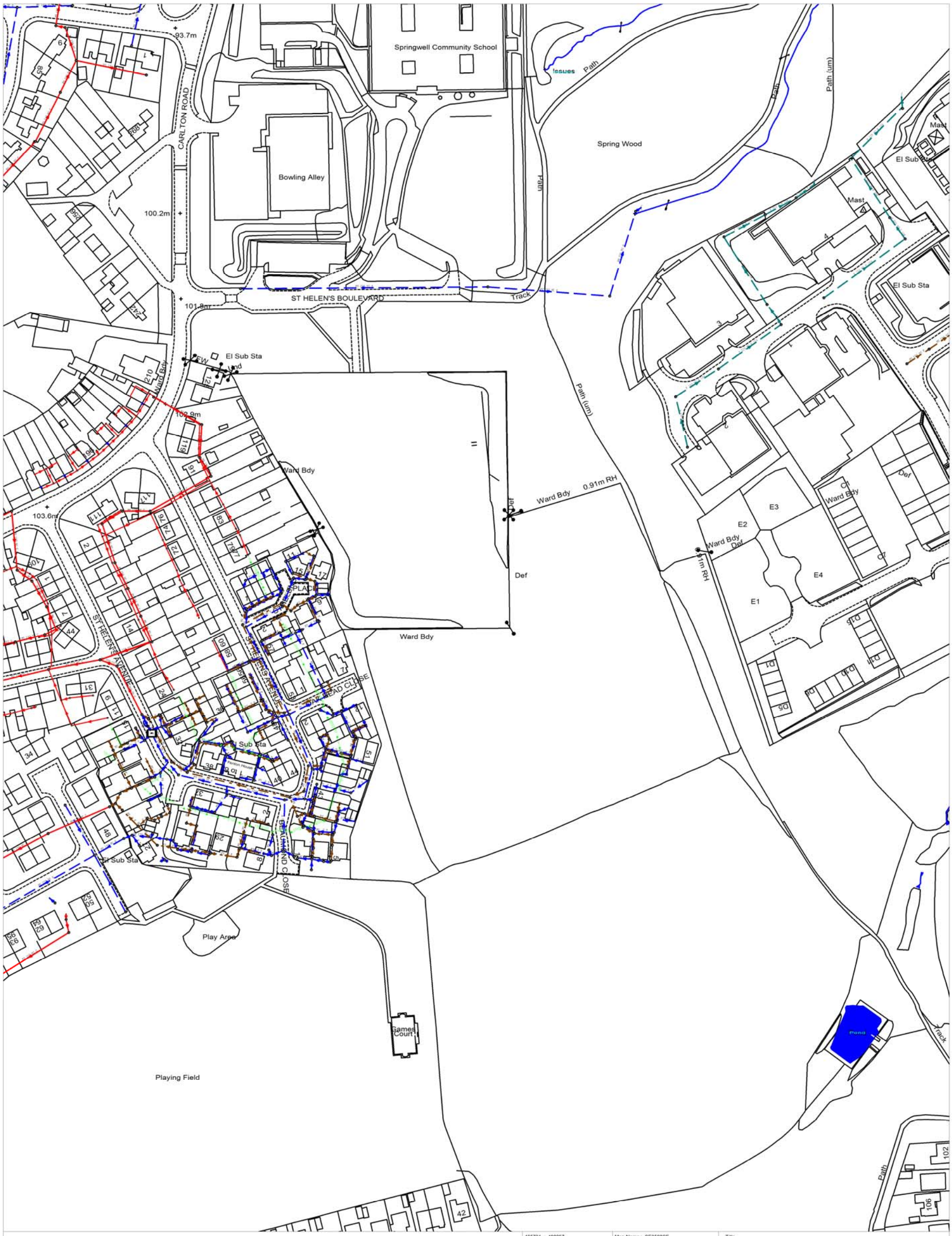

435731 : 408257	Map Name : SE3508SE	Title
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582	Notes
		Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partaily Separate = PS
		This 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 excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
		Date Req : 27/03/2017, 09:57:45 — Date Gen : 27/03/2017, 09:58:50
		Source : Sewer Network Enquiry

UPN: Undefined Originator: C ROBERTS, YorMap, 87 2582