Keepmoat Homes Yorkshire

Brunswick Street,

Thurnscoe

AB - 112

Flood Risk Assessment and Drainage Strategy

August 2019

This document has been prepared solely as a Flood Risk Assessment for Keepmoat Homes Yorkshire, AB Civils Design Ltd accepts no responsibility or liability for any use that is made of this document other than by the Client for which it was originally commissioned and prepared.

Contents

Appendices

1. Introduction

1.1 AB Civils Design Ltd have been commissioned by Keepmoat Homes, Yorkshire to undertake a Flood Risk Assessment (FRA) regarding a proposed residential development at Brunswick Street, Thurnscoe

1.2 A Full Planning application has been made for the construction of 49 new dwellings on the infill site of 1.17Ha

1.3 This FRA has been produced to demonstrate how flood risk from all sources of flooding, and flood risk to others from the development will be managed, in order to satisfy the requirements, set out in 'National Planning Policy Framework, and Technical Guidance to the National Planning Policy Framework'.

1.4 A full assessment of the flood risk to the site and consideration of the surface water management as a result of the development is to be considered in this investigation.

1.5 Data has been gathered from a number of other sources including; aerial photographs, Ordnance Survey (OS), the British Geological Society (BGS), National Soil Research Institute (NSRI), aerial photographs, Sewers for Adoption, SuDS Manual (C753) and anecdotal evidence obtained from the internet.

2. Site Description

2.1 *The overall site is approximately 1.17 hectares in size and is in the North East of Thurnscoe, approximately 15km to the North East of Rotherham*

2.2 *The site is currently open access brownfield land with a former use of previous residential dwellings demolished in approx. 2003. Existing residential properties and roads surround the site.*

2.3 *The site is split into three sperate infill parcels served from Brunswick Street, Cromwell Street and Lancaster Street.*

2.4 *Please refer to appendix 1 for the proposed site location.*

Site Levels

2.5 *A Topographical Survey was carried out by Haycock & Todd in September 2018 and can be viewed in Appendix 2.*

2.6 *The existing topography falls from the north east to south west direction across the all three infill a parcels on an average gradient of 1:40. The lowest point of the site averages at 62.12m AOD*

Hydrology

2.7 *An Unnamed watercourse is recorded 277m northeast of the site.*

2.8 *See appendix 1 for site location plan*

Hydrogeology

2.9 The bedrock beneath the site is classified as a Secondary Aquifer, capable of supporting water supplies at a local rather than a strategic scale.

2.10 The site does not lie within a source protection zone.

Existing Drainage Infrastructure

2.11 Existing public sewer records have been obtained from Yorkshire Water Ltd, they are shown in Appendix 3 of this report.

2.12 The site is surrounded by an existing combined sewer network with some of the sewers entering the proposed re development areas. Some of these will be used as part of the drainage strategy to serve the development.

2.13 See appendix 6 for Jet Aire drainage CCTV study

2.14 The surrounding sewer network has proven connections that served the previously demolished dwellings, and these vary in diameter through the existing network.

2.15 A pre development enquiry has been sent to Yorkshire Water to establish the permitted discharge rates of the post development run off for surface and foul water.

2.16 Yorkshire Water have agreed to a total run off rate of 12.5 l/s from the development.

2.17 See appendix 5 LLFA/YW correspondence

3. Flood Risk Assessment

3.1 *National Planning Policy Framework requires that: "A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall." NPPF March 2012 par 102 p24.*

3.2 *A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding. NPPF March 2012 footnote 20 p24.*

3.3 *The Planning Practice Guidance was published in March 2014. The new Guidance is intended to reflect and support (but not replace) the National Planning Policy Framework (the NPPF) published on 27 March 2012 and the core policy principles of the presumption in favour of sustainable development, the introduction of neighbourhood planning and recent changes in legislation.*

3.4 *The publication contains a section regarding Flood Risk and Costal Change and states that the tests as set out in the NPPF should be followed and where the tests are not met national policy is clear that new development should not be allowed. In summary, the key elements of the policy are designed to ensure that if there are better sites in terms of flood risk, or a proposed development cannot be made safe, it should not be permitted.*

Sources of Flooding

3.5 Flood risk has been assessed from the following sources; tidal and fluvial, surface water and flooding from the land, groundwater, sewer flooding and artificial sources (i.e. canals, reservoirs etc.).

Tidal and Fluvial Flooding

3.6 Inspection of the Environment Agency / Government flood map indicates that the site is located within flood zone 1 and so is considered to have the lowest probability of flooding from rivers and the sea.

3.7 The site is not located in a flood warning area.

3.8 Based on the available information flood risk from this source is considered LOW.

Ground Water

3.9 Groundwater flooding occurs by water originating from beneath the ground surface from permeable strata through a natural process, usually after periods of higher than average rainfall.

3.10 An intrusive ground investigation on the phase 1 and 2 sites was completed by Sirius Geotechnical and Environmental LTD November 2018. During the site investigation/ monitoring of boreholes, no groundwater was recorded.

3.11 Based on the available information flood risk from this source to the completed development is considered LOW.

Sewer Flooding

3.12 *There are existing sewers present on the roads and site which can cause a flood risk.*

3.13 *A network of combined sewers surrounds and enter the site, that are proposed to be used as part of the drainage strategy. Blockage of these sewers may result in flooding; however, these sewers are a YWL asset rather than a private drain.*

3.14 *The detailed design of the proposed development should consider the possibility of flood flow from this sewer when determining finished floor levels.*

3.15 *Based on the available information flood risk from this source is considered LOW.*

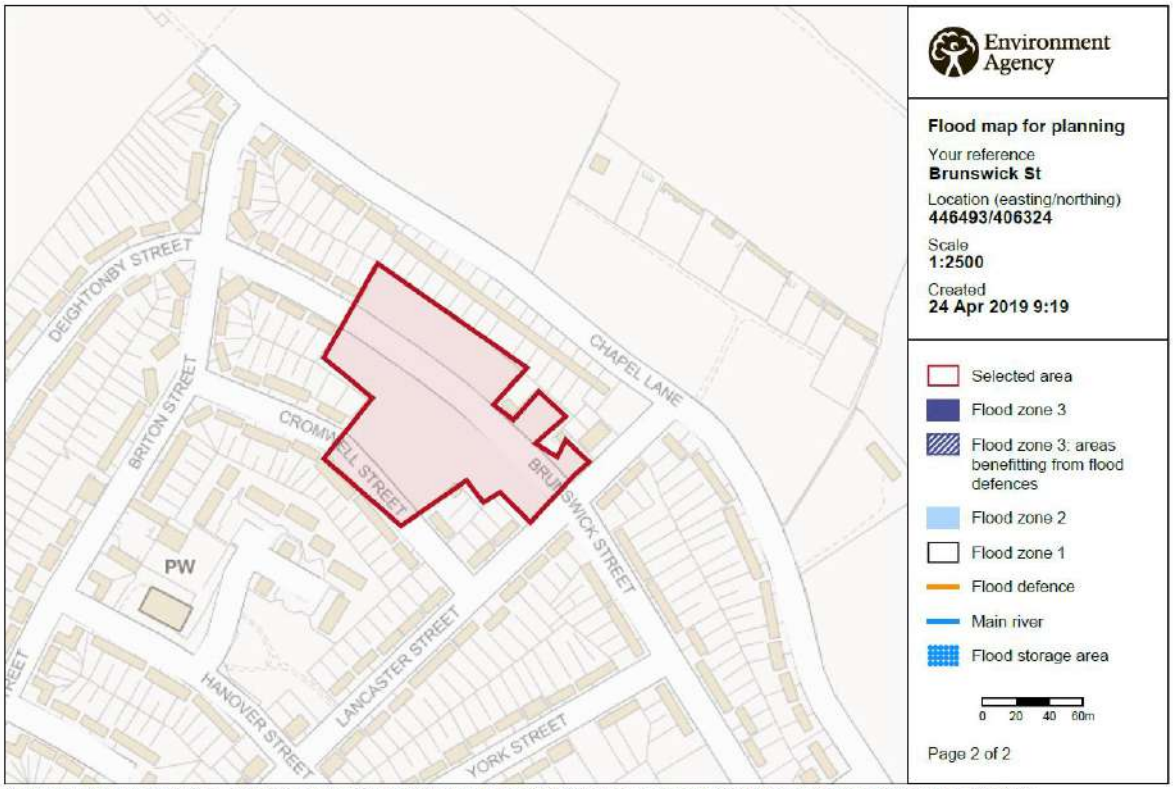
Overland Flow

3.16 *Flood risk from overland flow is generated from water flowing over the ground surface which has failed to reach a natural or artificial drainage feature. Flooding from overland flow can become a risk to any development if flooding occurs at a higher level than the development site.*

3.17 *Levels generally fall from the north eastern to south western directions of the site.*

3.18 *Inspection of EA surface water flooding maps show no existing surface water flood risk. No overland flows from the previously developed site have been recorded.*

3.19 *Sewer failure identified in paragraph 3.14 and 3.15 Should also be considered through detailed design.*



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3.20 Best practice measures will be applied to the development:

1) *Any land drainage which may be encountered during the development should be repaired and diverted through the site, using its existing outfall where possible.*
2) *Land drainage / infiltration trenches can be installed at site boundaries to collect any overland flow.*
3) *Proposed level design should consider existing flow paths, allowing flow to pass the site.*
4) *Proposed floor levels should be a minimum of 150mm above external ground level.*
5) *Construction of new 'Sewers for Adoption' compliant drainage network.*

3.21 With best practice implemented and based on available information flood risk from this source is considered LOW.

Land Drainage

3.22 *In the event of any land drainage being discovered during excavations on site, it is recommended that the drain is repaired or diverted. Should this not be possible due to layout constraints, then it is recommended that the land drain is further investigated by the development engineer, to determine if the drain is still required post development.*

3.23 *Due to the topography of the site, some retaining features may be required. The detailed design of these features will include adequate land drainage to prevent ground water emerging at the structures.*

3.24 *Based on the available information flood risk from this source is considered LOW.*

Artificial Sources

3.25 *Inspection of EA maps indicate that the development is not at risk off flooding from reservoir failure.*

3.26 *Based on available information, flood risk from this source is considered LOW.*

4. Summary of Flood Risk

4.1 Table 1 below summarises the sources of possible flooding which have been investigated and indicates any mitigation requirements.

Flood Risk Source	Current Risk Level	Mitigation Requirement during detailed design	Risk Level Following Mitigation
Tidal and Fluvial Flooding	LOW	Not Required	LOW
Groundwater	LOW	Not Required	LOW
Sewer Flooding	LOW	Detailed design should allow for any blockages within the development boundary	LOW
Overland Flow	LOW	Apply best practice measure in section 3.20 and 3.21	LOW
Land Drainage	LOW	Any land drainage encountered during construction is to be repaired	LOW
Artificial Sources	LOW	Not Required	LOW

5. Proposed Development

5.1 *Development of the site is proposed for residential use, compromising a maximum of 49 residential dwellings.*

Planning Context

5.2 *The EA flood maps show that the residential part of the development sits within FLOOD ZONE, which has a low probability of flooding in 1;1000 in anyone one year (0.1%). This is illustrated in Figure 1.*

5.3 *The proposed development will comprise residential dwellings. Therefore, in accordance with NPPF tables 1and 2:*

5.4 *The residential development is more vulnerable as illustrated in Figure1.*

5.5 *The classification parameters are illustrated in Figure 2 and 3*

5.6 *Thus, Given the site is situated in FLOOD ZONE 1 and the vulnerability classification in accordance with the NPPF compatibility matrix, the scheme is classified as appropriate for development.*

5.7 *Figure 1- NPPF Flood Zone Probability Extract*

Table 1 Flood Risk Probability

Flood Zone	Flood Probability	Explanation
Flood Zone 1	Low Probability	This zone comprises land assessed as having a less than 1 in 1,000-year annual probability of river or sea flooding (<0.1%)
Flood zone 2	Medium Probability	This zone comprises land of having a 1:100 or greater annual probability of river flooding (15 -0.1%), or between a 1:200 and 1 in 1000 annual probability of sea flooding (0.5% -0.1%) in any year
Flood Zone 3a	High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of river flooding from the sea
Flood zone 3b	Functional Floodplain	This zone comprises land where water has to flow has to flow or be stored in time of flood
Essential Infrastructure	• Essential Transport infrastructure (including mass excavation routes which has to cross the area at a risk, and strategically utility infrastructure, including electricity generating power stations and grid and primary sub stations.	
Highly Vulnerable	• Police stations, ambulance stations and fire stations and command centers and telecommunications installations required to be operational during flooding • Emergency dispersal points • Basement dwellings • Caravans, mobile homes and park homes intended for permanent residential use • Installations requiring hazardous substances consent	
More Vulnerable	• Hospitals • Residential institutions such as residentials care homes, children's homes, social services homes, prisons and hotels • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non residential uses for health services, nurseries and educational establishments • Land fill sites used for waste management facilities for hazardous waste • Sites for used for waste management facilities for hazardous waste • Sites used for holiday or short let caravan and camping subject to a specific warning and evacuation plan.	
Less Vulnerable	• Buildingsusedfor:shops;financial,professionalandotherservices; restaurantsandcafes;hotfoodtakeaways;offices;generalindustry;	

	storage and distribution; non–residential institutions not included in 'more vulnerable'; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment plants. • Sewage Treatment Plants (if adequate pollution measure are put in place)
Water Compatible Development	• Flood control infrastructure • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defense installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

5.8 Figure 2 – NPPF Flood Risk Vulnerability Classification Extract

Table 3 Flood Risk Compatibility					
Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Appropriate	Appropriate	Compatible	Appropriate	Appropriate
Zone 2	Appropriate	Appropriate	Exception Test required	Appropriate	Appropriate
Zone 3a	Exception Test required	Appropriate	Not Permitted	Exception Test required	Appropriate
Zone 3b	Exception Test required	Appropriate	Not Permitted	Not Permitted	Not Permitted

Figure 3 - NPPF Flood Risk Vulnerability and Flood Zone Classification Extract

6. *Management of Surface Water*

Existing Drainage Regime

6.1 *The existing site is classed as brownfield; therefore, the modified rational method used to calculate pre development run off rates has been completed based on the area of existing positive drainage on the site.*

Modified rational method - 2.78CIA 2.78 C=coefficient I = Intensity (mm per hour) = A = Area in Hectares

2.78x50x1x0.282 = 39.1 L/S

Common practice is to provide 30% betterment to the existing sewerage network, and this is also recommended in the Yorkshire pre development response

39.1 x 0.7 = 27.3L/S

6.2 *See appendix 7 for previous impermeable area measures and calculations*

6.3 *The LLFA have agreed to the brownfield calculations above but a total permitted run off for surface water from the site has been provided by Yorkshire Water and restricted to a* ***maximum of 12.5 l/s***

6.4 *See Appendix 5 for LLFA and YW correspondence*

Existing Drainage Regime

6.5 *In accordance with building regulations and NPPF the disposal of surface water has been considered in the following order of priority;*

An adequate soakaway or some infiltration system, or, where not reasonably practicable, A watercourse, or where not reasonably practicable discharge to a public sewer

Infiltration

6.6 *Detailed ground investigation has been completed by Sirius geotechnical dated October 2018.*

6.7 *3no Infiltration test were undertaken and these can be viewed in appendix 9*

6.8 *Infiltration has been ruled out as method of surface water disposal for the site, none of the tests yielded a satisfactory result.*

Discharge to a Watercourse

6.9 *There is no known watercourse in proximity or accessible to the site and a discharge to a watercourse is deemed unfeasible.*

Discharge to Public Sewers

6.10 *The development will discharge to the existing sewer combined sewer network located in the surrounding streets of the development.*

7. Preferred Drainage Solution

7.1 *The preferred drainage strategy will involve the disposal of surface and foul water flows into the existing combined sewers on site.*

Storm Drainage

7.2 *The proposed development will restrict surface water to a maximum discharge of 12.5 l/s*

7.3 *See appendix 5 for LLFA and Yorkshire Water correspondence.*

7.4 *This restriction will require surface water to be attenuated on site in the form of private geo-cellular attenuation located in the front drives of the properties. A full detailed drainage design will be required.*

Foul Drainage

7.5 *The development of 49 dwellings will generate a foul flow rate of 2.26 l/sec based on 4000 l/s per dwelling per day.*

7.6 *This flow is expected to discharge into the existing combined sewers surrounding the site.*

7.7 *Multiple connections into the existing Adopted sewers will require permission from Yorkshire Water.*

8. Conclusion

8.1 *There is low risk of flooding from fluvial sources with a probability of 1 in 1000 in any one year (<0.1%). The proposed development is classified as 'more vulnerable' and is located within FLOOD ZONE 1, therefore the development is suitable within this flood zone in accordance with NPPF. Employment of the mitigation measures stated this report will ensure that the development is safe.*

8.2 *Flood risk from all sources has been considered and with mitigation where necessary it has been established that these sources do not pose a risk to the development.*

Surface Water Management

8.3 *Management of the surface water flows have been considered in accordance with Building Regulations H3 Section 3.*

8.4 *Surface water runoff will be restricted to post development run off rate of 12.5 l/s as a combined run off for all three infill sites subject to the approval of Yorkshire Water.*

Foul Drainage

8.5 *It is proposed to discharge foul flows to the existing public sewer network.*

8.6 *All private foul drainage will be designed to building regs.*

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Appendix 1

Location Plan

AB CIVILS DESIGN

Proposed Residential Development @ Brunswick Street. Thurnscoe.

• D143 • D Mill • Dean Clough Mills • Halifax • HX3 5AX • +44 1422 380047 • www.knaptonandknapton.co.uk •

Designers of the Built Environment

Scale • 1:1250@A3 Drawn By • PK
Date • 28/01/19 Checked by • NL
Drg No • PL-01 Date • 28/01/19

North

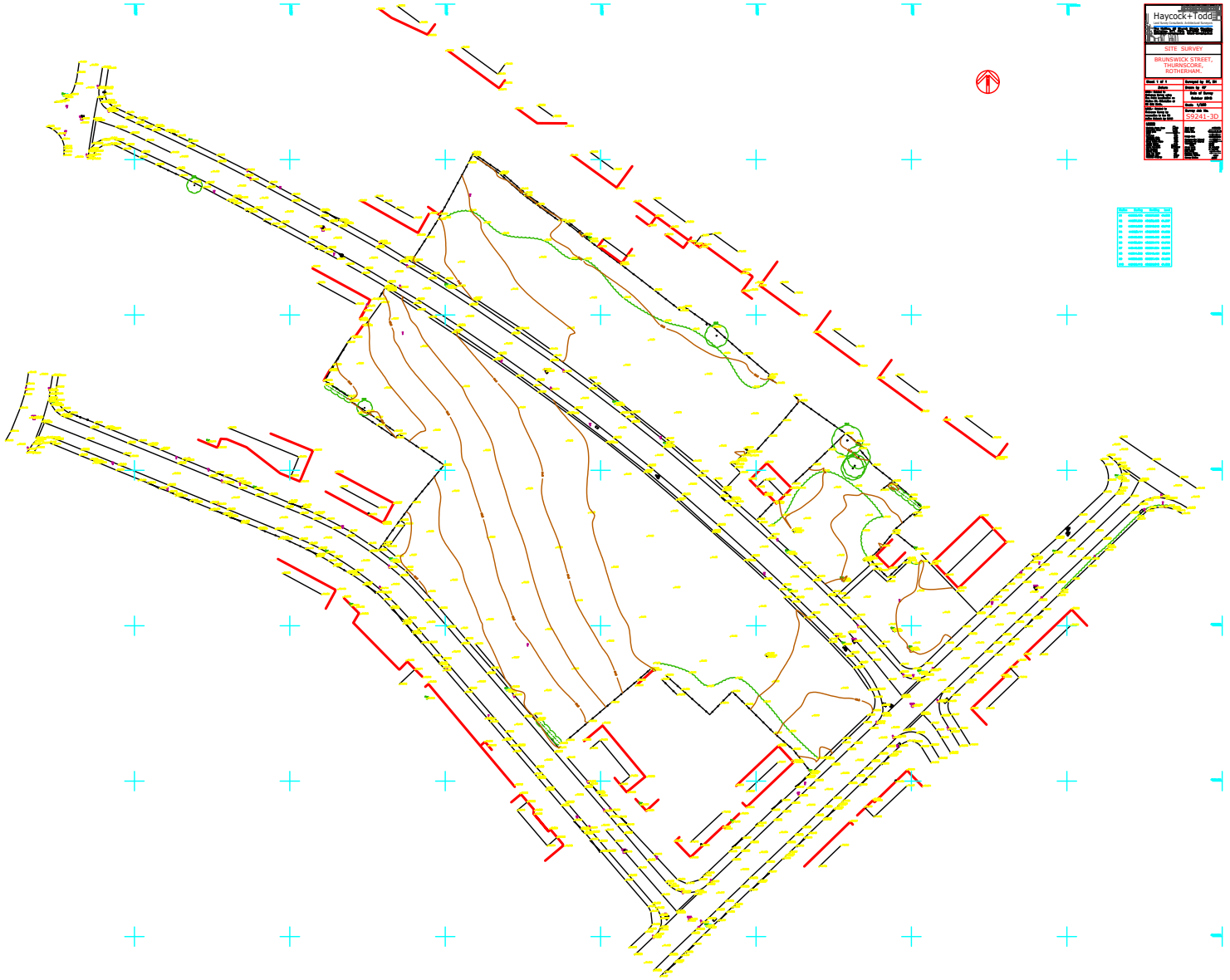
Client • Keepmoat Homes Ltd.
Site • Thurnscoe
Plan • Location Plan

0 5 10 20 50
Scale Bar 1:500

Appendix 2

Topographical Survey

AB CIVILS DESIGN


Haycock+Todd
SITE SURVEY
BRUNSWICK STREET,
THURNSCOE,
ROTHERHAM
S5241-3D

Appendix 3

Yorkshire Water Pre-Development enquiry

AB CIVILS DESIGN

YorkshireWater

Mr A Dayel
Keepmoat Homes
The Waterfront
Lakeside Boulevard
Doncaster
DN4 5PL

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: N/A
Our Ref: U015118

5th October 2018

Dear Mr Dayel,

Brunswick Street, Thurnscoe, Rotherham, S63 0HU - Pre-Planning Sewerage Enquiry - T163549 - RESIDENTIAL

Thank you for your recent enquiry. Our charge of £158.93 (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

On the Statutory Sewer Map, there are public combined water sewer recorded to cross the site. It is essential that the presence of this infrastructure is 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 combined sewer recorded crossing 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.

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.

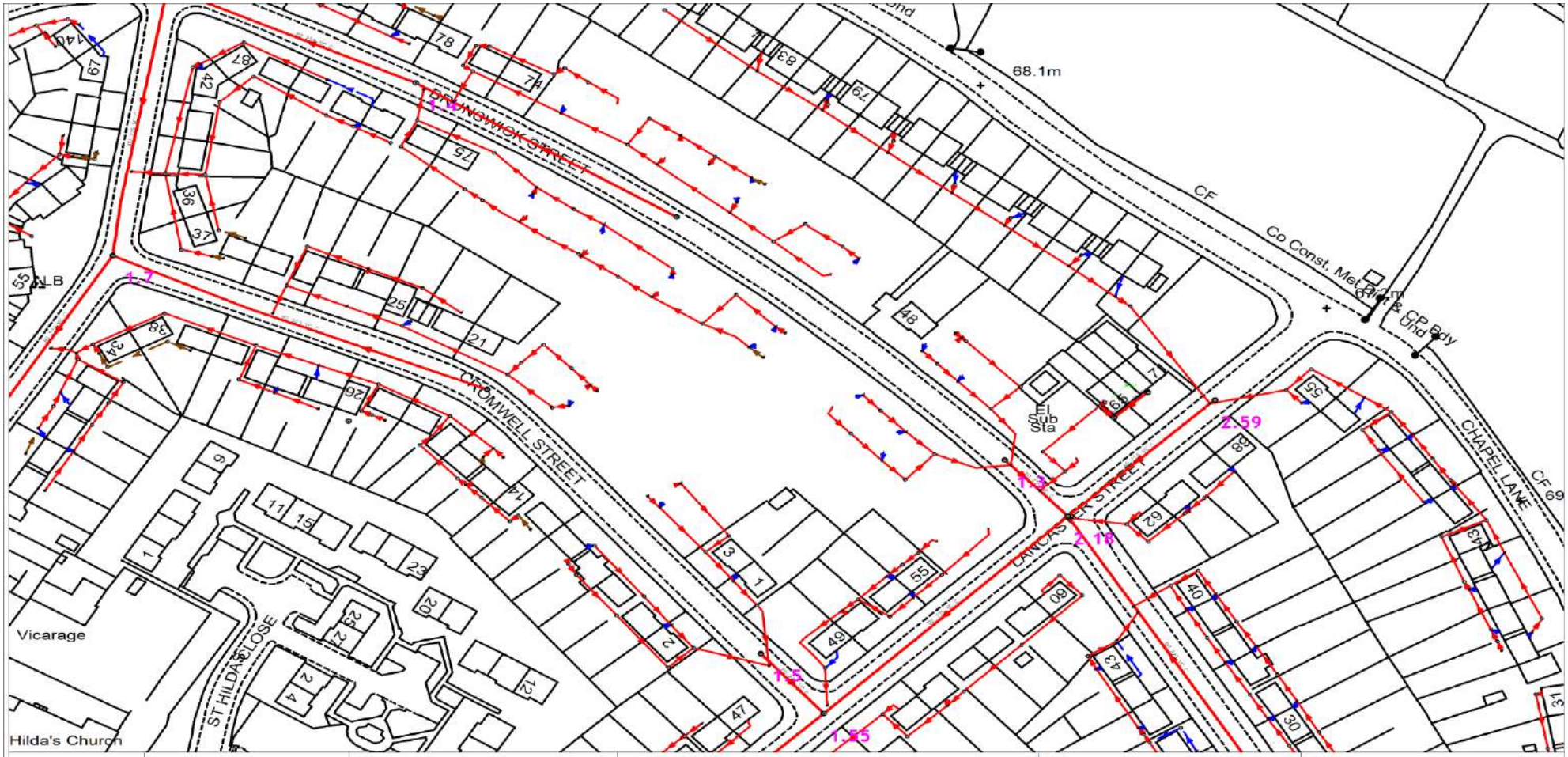
An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able 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.

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 sincerely

Chris Roberts
Sewerage Technician
Developer Services



446275 : 406175	Map Name : SE4606SW	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
YorkshireWater Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582		Notes (Cdy) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432	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 : 05/10/2018, 12:55:46	Date Gen : 05/10/2018, 12:57:34
		Source : Sewer Network Enquiry	

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

Appendix 4

UK SuDS Report

AB CIVILS DESIGN

HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	
Site name:	Brunswick Street, Thurnscoe
Site location:	Thurnscoe

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	53.55096° N
Longitude:	1.30105° W
Reference:	
Date:	2019-04-24 11:03

Methodology	IH124

Site characteristics

Total site area (ha)	1.17
Significant public open space (ha)	0
Area positively drained (ha)	1.17
Pervious area contribution (%)	30
Impermeable area (ha)	0.643
Percentage of drained area that is impermeable (%)	55
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	1.17
Net impermeable area for storage volume design (ha)	0.72

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage

	Default	Edited
Climate change allowance factor	1.4	1.4
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
Qbar total site area (l/s)	4.87	--
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	617	617
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.4	0.4
Rainfall 100 yrs 6 hrs	63	
Rainfall 100 yrs 12 hrs	80.85	
FEH/FSR conversion factor	1.05	1.05
Hydrological region	3	
Growth curve factor: 1 year	0.86	0.86
Growth curve factor: 10 year	1.45	1.45
Growth curve factor: 30 year	1.75	1.75
Growth curve factor: 100 year	2.08	2.08

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	4.87	4.87
Qbar net site area (l/s)	4.87	4.87
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	8.5	8.5
1 in 100 years (l/s)	10.1	10.1

Estimated storage volumes

	Default	Edited
Interception storage (m^3)	26	26
Attenuation storage (m^3)	480	480
Long term storage (m^3)	0	0
Treatment storage (m^3)	77	77
Total storage *(excluding treatment)* (m^3)	506	506

This report was produced using the Storage estimation tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for use of this data in the design or operational characteristics of any drainage scheme.

Appendix 5

LLFA/YW correspondence

AB CIVILS DESIGN

Hi Andrew,

I can confirm that the flow rates stated are acceptable to BMBC as Lead Local Flood Authority.

Regards

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

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

From: Andrew Bradley [mailto:andrew@abcivilsdesign.co.uk]
Sent: 04 April 2019 09:43
To: Atkins , Wayne
Cc: Chris Cammidge; Martin Ingram
Subject: Brunswick Street, Thurnscoe

Wayne

We have been appointed as the consulting engineers for the site refenced above that has been submitted for planning. I have attached the site plan, sewer records and a previous impermeable area measure for your reference. I'm sure you have knowledge of the local area and the site benefits from having a network of existing combined sewers in the adjacent roads. You will see form the plans that this is an infill, brownfield site and no watercourses are located in the local vicinity. There is a CCTV report also provided showing the previous connections to the old houses.

Soakaway Testing was carried out by Sirius but deemed unsuitable during a geotechnical investigation and I have attached the logs for your review.

Using the Modified Rational Method I have calculated up the run off from the old buildings and hard standings.

Modified rational method -- 2.78CIA 2.78 C=coefficient I = Intensity(mm per hour) = A = Area in Hectares

2.78x50x1x0.282 = **39.1 L/S**

Yorkshire Water have provided a pre planning response (attached) stating that we can use the existing sewers with a 30% reduction of the previous uses.

39.1 x 0.7 = **27.3L/S**

I was hoping you could confirm your acceptance of this run off rate so I can agree this with Yorkshire water and commence the detailed drainage design?

Any questions please give me call.

Regards

Andrew

Andrew Bradley
Managing Director
E: andrew@abcivilsdesign.co.uk
T: 01949 860111
M:07850662772

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NG13 9GH

Company Number 1119323
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From: Chris.Roberts@yorkshirewater.co.uk <Chris.Roberts@yorkshirewater.co.uk> **On Behalf Of** technical.sewerage@yorkshirewater.co.uk
Sent: 03 May 2019 13:31
To: Martin Ingram <Martin.Ingram@keepmoat.com>
Subject: RE: Brunswick Street, Thurnscoe REF - T163549

Hi Martin,

Thank you for your email.

I would have no objection to your proposal to have 5 separate discharges of 2.5 l/s as per drawing so 12.5 l/s for the whole development.

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 ***

Do you know you can now apply and pay your application fees on line ? We are working hard to continually develop and improve your customer experience, for more information and applications please follow this link https://www.yorkshirewater.com/developers/apply-online/.

|---------->
| From: |
|---------->
>----------|
|Martin Ingram <Martin.Ingram@keepmoat.com> |
>----------|
|---------->
| To: |
|---------->
>----------|
|"'technical.sewerage@yorkshirewater.co.uk'" <technical.sewerage@yorkshirewater.co.uk> |
>----------|
|---------->
| Cc: |
|---------->
>----------|
|Jamie Moran <Jamie.Moran@keepmoat.com>, "'Andrew Bradley'" <andrew@abcivilsdesign.co.uk>, Chris Cammidge <Christopher.Cammidge@keepmoat.com> |
>----------|
|---------->
| Date: |

|---------->
>----------
----------|
|24/04/2019 13:03 |
>----------
----------|
|---------->
| Subject: |
|---------->
>----------
----------|
|RE: Brunswick Street, Thurnscoe REF - T163549 |
>----------
----------|

For the attention of Chris Roberts,

Hello Chris,

Thank you for your email below to our consultant AB Civils Design. The surface water run-off from the demolished buildings drained to the combined sewer, we accept the principle that due to the number of years the properties have been demolished that standard brownfield rules do not apply, however as a compromise we would appreciate it if you could allow 2.5 l/sec from each connection, either side of Brunswick Street, to the combined sewer to suit the topography of the site, the site being split by a public highway and to enable us to install a suitable sized Hydrobrake (albeit private) and to avoid crossing the highway with private drains.

So we would seek approval to 7.5 l/sec to the system to the north and 5 l/sec to the system to the south.

I hope you can look favourably on this request and look forward to hearing from you.

Kind Regards

Martin

M:07827 662913

Martin Ingram

Engineering Manager

Dear Mr Bradley,

Brownfield comments refer to sites that are still positively connected and draining to our sewer network. Looking at the information available this site has not actively drained to our sewer network since pre 2009 and from a YW stand point unless CCTV evidence was provided showing active drainage on site in the form of down pipes and gullies it would be classed as greenfield.

From the CCTV survey the only drainage that appears to still be positively draining to our network is the road gully/drains and possibly the roof tops of the derelict properties to the east 48 Brunswick Street.

Its accepted that soakaways will not be viable but I would not agree to your proposed discharge of 27.3 l/s.

I would agree to a maximum surface water discharge of 5 l/s to the site north of Brunswick Street a maximum surface water discharge of 5 l/s to the site south of Brunswick Street.

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 ***

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Appendix 6

Brownfield Run Off Calculations

AB CIVILS DESIGN

Modified rational method -- 2.78CIA 2.78 C=coefficient I = Intensity(mm per hour) = A = Area in Hectares

2.78x50x1x0.282 = **39.1 L/S**

Yorkshire Water have provided a pre planning response (attached) stating that we can use the existing sewers with a 30% reduction of the previous uses.

39.1 x 0.7 = **27.3L/S**

*Since this proposal has been put forward Yorkshire Water have agreed to a total of 10 L/s maximum discharge rate from the development.

The LLFA had previously agreed to the run off rate of 27.3 L/S

Appendix 7

Previous Impermeable Area Plan

AB CIVILS DESIGN

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all dimensions to be checked on site and architect notified of any discrepancies prior to commencement.
do not scale.

notes:

N

Scale Check:

1:20 - 0 200mm 400mm 600mm 800mm 1000 1200
1:100 - 0 1m 2m 3m 4m 5m 6m
1:50 - 0 1m 2m 3m
1:5 - 0 100mm 200mm 300mm

Housing Impermeable Area Total 0.225Ha

Hardstanding Impermeable Area Total 0.056Ha

Existing Adoptable Sewer from Centaro sub scan

Brunswick St

rev:	date:	comment(s):	name:	check:
.				

AB CIVILS DESIGN

status: Feasibility

client: Keepmoat Homes - Yorkshire 2

job: Brunswick Street, Thurnscoe

title: Previous Impermeable Areas

drawn: APB date: 3.4.2019 scale @ A1: 1:250

job no: ABCD-KH 1004 drg no: VL - 001

AB Civils Design, Unit 1D, Vale Business Park, Barstone Road, Lanagar, Nottingham, NG13 9GH
T: 01949 860111 M: 07850 662772
andrew@abcivilsdesign.co.uk

Appendix 8

Jet Aire CCTV Report

AB CIVILS DESIGN

NO ACCESS TO MH DUE
MH3 TO PARKED CARS
(REQUIRES TM)

SA - Due to debris.

MH2
D=1.38m

SA - Due to debris.
(Survey overlapped)

MH1
D=1.15m

BRUNSWICK STREET

NO ACCESS TO MH DUE
TO PARKED CARS
(REQUIRES TM)
MH4

MH5
BURIED

CROMWELL STREET

MH6
D=1.35m

MH10
D=1.65m
NO ACCESS TO MH DUE
TO PARKED CARS

LANCASTER STREET

MH9
UTR (SEIZED)

MH7
D=1.49m

MH8
UTR (SEIZED)

UTL
MH11

ST HILDAS CLOSE

El Sub Sta

Key

Combined Water Drain:
Foul Water Drain:
Surface Water Drain:
Trade Effluent Drain:
Assumed Route:
Manhole/IC:
Rodding Eye (RE):
Gully (GY):
Rain Water Pipe (RWP):
Soil Vent Pipe (SVP):
Outfall:
ACO (Slot Drain):
UTL: Unable to Locate
UTGA: Unable to Gain Access
UTS: Unable to Survey
UTR: Unable to Raise (lift)
Report Sections: 1, 2, 3, etc.

JET AIRE SERVICES
Tel: 0113 3935500
Email: enquiries@jetaire.co.uk
Website: www.jetaire.co.uk

Site: Brunswick Street Site
Thurnscoe
S63 0HH

Client: Keepmoat Homes Ltd

Date: 12/10/2018

Job No: GR/3155

Scale: Not To Scale @ A2

PLEASE NOTE THIS DRAWING & LAYOUT IS FOR GUIDANCE PURPOSES ONLY. THE ACCURACY & LOCATION OF THE DRAINAGE SYSTEM CANNOT BE GUARANTEED.

Appendix 9

Soak Away Test Results

AB CIVILS DESIGN

APPENDIX E

EXPLORATORY HOLE LOGS

TRIAL PIT RECORD

TP No. **SA01**
Sheet 1 of 1

Site: Brunswick Street, Thurnscoe
Contract No: C8022
Client: Keepmoat Homes
Date: 20/09/2018
Method: JCB 3CX with 18" bucket
Scale: 1:25
Logged By: RC
Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) (ppm)	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Grass over greyish brown gravelly slightly clayey SAND with low cobble and boulder content. Gravel is fine to coarse sub-angular of brick, concrete and sandstone, with fragments of plastic, tile and wood. Cobbles are angular of brick. Boulders are sub-angular of concrete.				
				Stiff, pale grey mottled light brown gravelly CLAY. Low plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	0.60	62.18		
				Stiff, grey and black gravelly CLAY. Low plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone and carbonaceous siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	1.30	61.48		
				Very stiff grey gravelly CLAY. High plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	1.40	61.38		
				End of trial pit at 1.90m	1.90	60.88		

1
2
3
4
5

Remarks and Groundwater Observations

1. Terminated in natural ground. 2. No groundwater encountered. 3. No visual or olfactory evidence of contamination. 4. Trial pit excavation was stable. 5. Trial pit was backfilled with gravel and arisings on completion to allow an infiltration test to be undertaken (soakaway infiltration test ref. SA01).

GL (m AOD) 62.78
Easting: 446442.80
Northing: 406314.89

Fig No. SA01

TRIAL PIT RECORD

TP No. **SA02**
Sheet 1 of 1

Site: Brunswick Street, Thurnscoe	Contract No: C8022
Client: Keepmoat Homes	Date: 20/09/2018
Method: JCB 3CX with 18" bucket	Scale: 1:25
	Logged By: RC — Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) (ppm)	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Grass over greyish brown gravelly slightly clayey SAND. Gravel is fine to coarse sub-angular of brick, concrete and sandstone, with fragments of plastic, tile and wood.				
				Stiff grey mottled orangish brown gravelly CLAY. High plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	0.30	64.07		
				Extremely weak distinctly weathered grey SILTSTONE. Recovered as clayey fine to coarse, angular to tabular gravel. [PENNINE UPPER COAL MEASURES FORMATION]	1.60	62.77		
				End of trial pit at 1.90m	1.90	62.47		

1 2 3 4 5

Remarks and Groundwater Observations

1. Terminated in natural ground. 2. No groundwater encountered. 3. No visual or olfactory evidence of contamination. 4. Trial pit excavation was stable. 5. Trial pit was backfilled with gravel and arisings on completion to allow an infiltration test to be undertaken (soakaway infiltration test ref. SA02).

GL (m AOD) 64.37
Easting: 446483.04
Northing: 406277.70

Fig No. SA02

TRIAL PIT RECORD

TP No. **SA03**
Sheet 1 of 1

Site: Brunswick Street, Thurnscoe
Contract No: C8022
Client: Keepmoat Homes
Date: 20/09/2018
Method: JCB 3CX with 18" bucket
Scale: 1:25
Logged By: RC
Checked By: GH

SAMPLE DETAILS | STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) (ppm)	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				MADE GROUND: Grass over greyish brown gravelly slightly clayey SAND. Gravel is fine to coarse sub-angular of brick, concrete and sandstone, with fragments of plastic, tile and timber.				
				Stiff, grey mottled orangish brown slightly sandy gravelly CLAY. High plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	0.35	64.23		
				Greyish brown sandy GRAVEL. Gravel is fine to coarse, angular to tabular of sandstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	1.40	63.18		
				Stiff grey mottled brown gravelly CLAY. High plasticity (field description). Friable. Gravel is fine to coarse, sub-angular of siltstone. [RESIDUAL PENNINE UPPER COAL MEASURES FORMATION]	1.70	62.88		
				End of trial pit at 1.80m	1.80	62.78		

1
2
3
4
5

Remarks and Groundwater Observations

1. Terminated in natural ground. 2. No groundwater encountered. 3. No visual or olfactory evidence of contamination. 4. Trial pit excavation was stable. 5. Trial pit was backfilled with gravel and arisings on completion to allow an infiltration test to be undertaken (soakaway infiltration test ref. SA03).

GL (m AOD) 64.58
Easting: 446539.38
Northing: 406315.41

Fig No. SA03

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Keepmoat Homes		
Site:	Brunswick Street, Thurnscoe		
Job No:	C8022	Test No:	SA01

CALCULATION OF SOIL INFILTRATION RATE

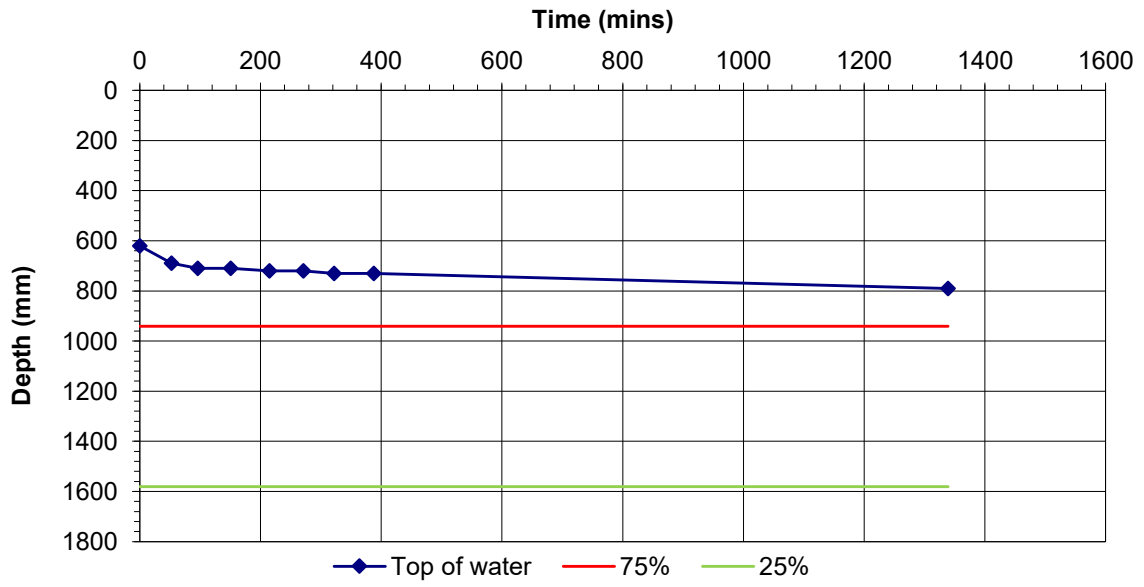
Time (min)	Depth (mm)
0	620
53	690
96	710
151	710
215	720
271	720
322	730
388	730
1339	790

Size of Soakaway		
	Length (m) =	2.20
	Width (m) =	0.50
	Depth (m) =	1.90

Depth at start of test (mm)=	620mm
Depth of trial pit (mm)=	1900mm
75% effective depth (mm)=	940mm
50% effective depth =	1260mm
25% effective depth =	1580mm
Base area of pit (m^2) =	1.100
Effective area of loss 50% (m^2) =	4.556
Volume outflow 75 - 25% (m^3) =	0.704

From the graph:	
tp 75 (min) =	NA
tp 25 (min) =	NA

DRAFT Soil infiltration rate, f, (m/s) =	NA	Normal test
Input by:	RC	Date: 26/09/2018
Checked by:	GH	Date: 01/10/2018



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Keepmoat Homes		
Site:	Brunswick Street, Thurnscoe		
Job No:	C8022	Test No:	SA02

CALCULATION OF SOIL INFILTRATION RATE

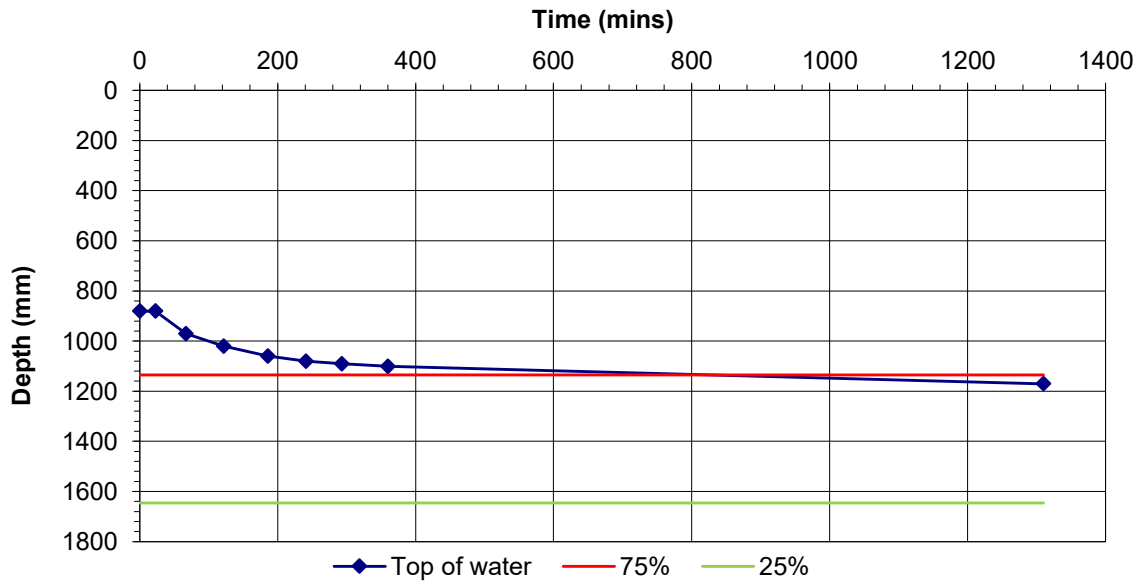
Time (min)	Depth (mm)
0	880
23	880
67	970
122	1020
186	1060
241	1080
293	1090
360	1100
1310	1170

Size of Soakaway		
	Length (m) =	2.40
	Width (m) =	0.50
	Depth (m) =	1.90

Depth at start of test (mm)=	880mm
Depth of trial pit (mm)=	1900mm
75% effective depth (mm)=	1135mm
50% effective depth =	1390mm
25% effective depth =	1645mm
Base area of pit (m^2) =	1.200
Effective area of loss 50% (m^2) =	4.158
Volume outflow 75 - 25% (m^3) =	0.612

From the graph:	
tp 75 (min) =	800
tp 25 (min) =	NA

DRAFT Soil infiltration rate, f, (m/s) =	NA	Normal test
Input by:	RC	Date: 26/09/2018
Checked by:	GH	Date: 01/10/2018



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2007			
Client:	Keepmoat Homes		
Site:	Brunswick Street, Thurnscoe		
Job No:	C8022	Test No:	SA03

DRAFT CALCULATION OF SOIL INFILTRATION RATE

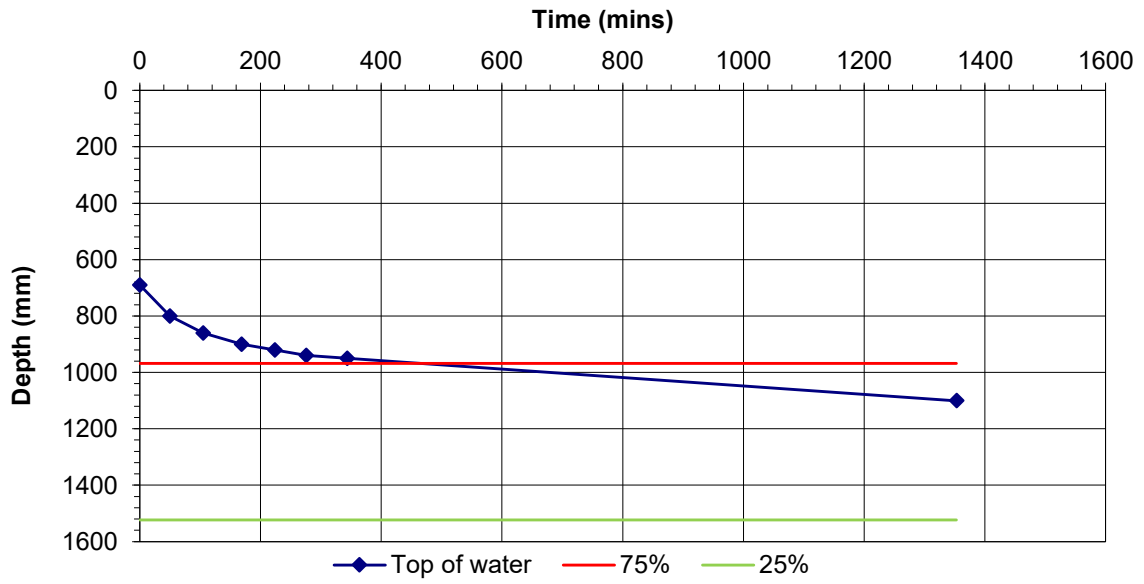
Time (min)	Depth (mm)
0	690
50	800
105	860
169	900
224	920
276	940
344	950
1353	1100

Size of Soakaway		
	Length (m) =	2.40
	Width (m) =	0.50
	Depth (m) =	1.80

Depth at start of test (mm)=	690mm
Depth of trial pit (mm)=	1800mm
75% effective depth (mm)=	968mm
50% effective depth =	1245mm
25% effective depth =	1523mm
Base area of pit (m^2) =	1.200
Effective area of loss 50% (m^2) =	4.419
Volume outflow 75 - 25% (m^3) =	0.666

From the graph:	
tp 75 (min) =	450
tp 25 (min) =	NA

DRAFT Soil infiltration rate, f, (m/s) =		NA	Normal test
Input by:	RC	Date:	26/09/2018
Checked by:	GH	Date:	01/10/2018



Appendix 10

EA Flood Maps

AB CIVILS DESIGN

Flood map for planning

Your reference	Location (easting/northing)	Created
Brunswick Str	**446464/406297**	**3 Apr 2019 7:29**

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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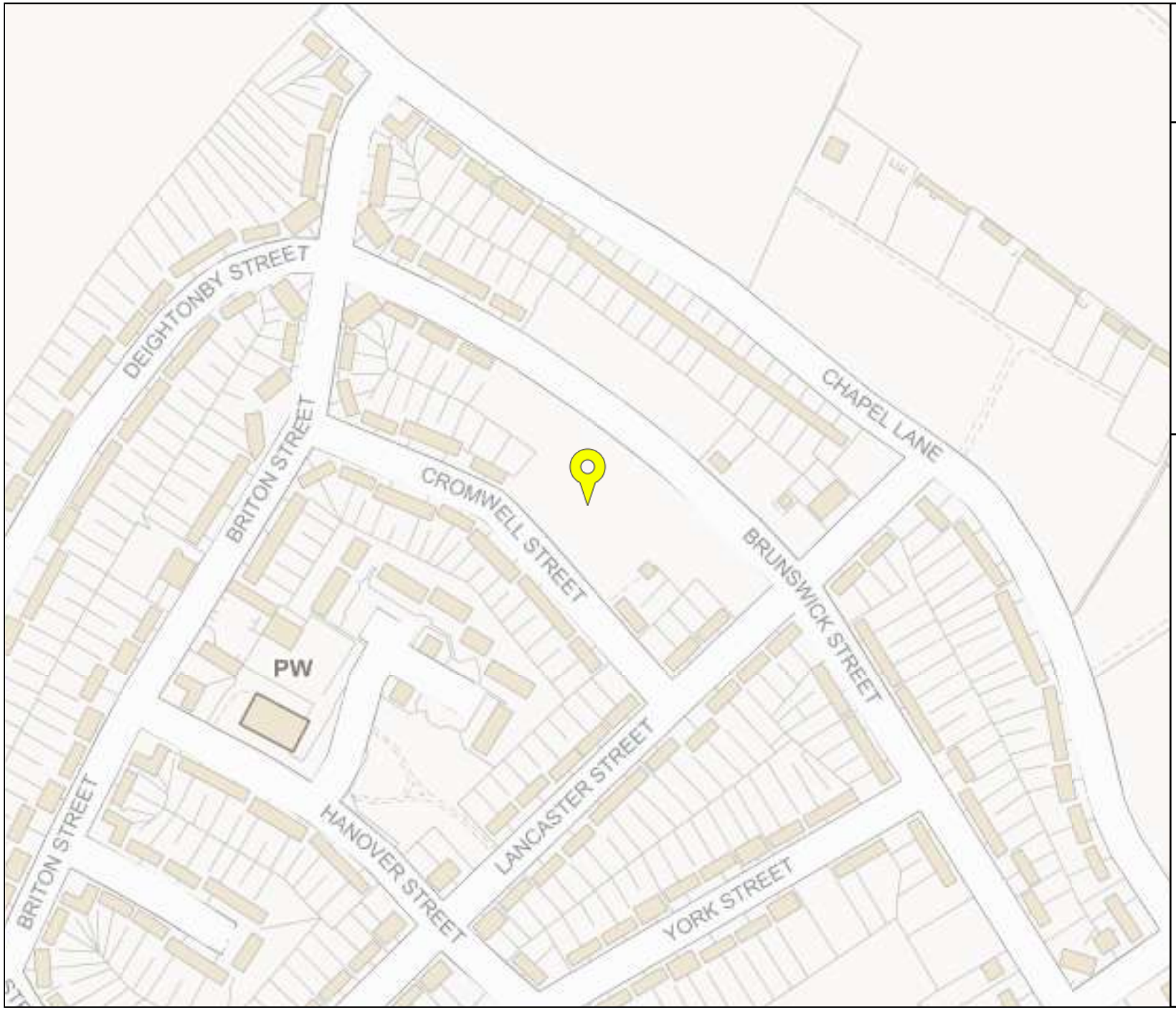
https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/



Environment Agency

Flood map for planning

Your reference
Brunswick Str

Location (easting/northing)
446464/406297

Scale
1:2500

Created
3 Apr 2019 7:29

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

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