Report No: 20/022.01
Revision: 02
Dated: 10th December 2020

Development off Barnburgh Lane Goldthorpe Phase 3

Flood Risk Assessment

Client:

Gleeson Regeneration Ltd
5 Europa Court
Sheffield Business Park
Sheffield
S9 1XE

Prepared by:

joc consultants ltd

Park Farm House
Leathley Lane
Leathley
Otley
LS21 2JU

REVISION HISTORY

Revision	Date	Details
00	17th November 2020	First issue
01	9th December 2020	Revised drainage proposals
02	10th December 2020	Minor amendments

CONTENTS

1.0 INTRODUCTION 6
2.0 OBJECTIVES 6
3.0 PLANNING POLICY ON FLOOD RISK 6
3.1 National Policy 6
3.2 Local Policy 7
3.3 Planning Practice Guidance 7
4.0 LOCATION AND DESCRIPTION OF THE SITE 7
5.0 THE PROPOSED DEVELOPMENT 8
6.0 EXISTING FLOOD RISK 9
6.1 Assessment methodology 9
6.2 History of Flooding 9
6.3 Flood zones 9
6.4 Flood warning 9
6.5 Fluvial flood risk 10
6.6 Surface water flood risk 10
7.0 EFFECTS OF CLIMATE CHANGE 11
7.1 Climate change allowances 11
7.2 Peak river flow allowances 11
7.3 Peak rainfall intensity 11
8.0 EFFECT OF THE DEVELOPMENT ON FLOOD RISK 12
8.1 Effect on the site 12
8.2 Effect on the watercourse 12
9.0 FLOOD RISK MANAGEMENT 14
9.1 Fluvial flood risk 14
9.2 Surface water flood risk 15
9.3 Residual risks 16
10.0 CONCLUSIONS AND RECOMMENDATIONS 16

10.1 Conclusions 16

10.2 Recommendations 18

11.0 REFERENCES 19

APPENDICES

APPENDIX A: Topographical survey plan

APPENDIX B: Yorkshire Water sewer plans

APPENDIX C Planning layout drawing – revision D

APPENDIX D: Flood Map for Planning

APPENDIX E: Surface water flood maps

APPENDIX F: Reservoirs flood map

APPENDIX G: REFH2 estimates of peak runoff rates and volumes from the site

APPENDIX H: REFH2 estimates of peak runoff rates and volumes from the watercourse catchment

APPENDIX I: Estimate of watercourse channel capacity under free flow conditions

APPENDIX J: Micro Drainage calculations by James Eaton Design Ltd

ABBREVIATIONS

AEP:	Annual exceedance probability
AOD:	Above Ordnance Datum
CCA:	Climate change allowance
FEH:	Flood Estimation Handbook
FRA:	Flood risk assessment
LLFA:	Lead Local Flood Authority
PPG:	Planning Practice Guidance
ReFH2:	ReFH2: Revitalised flood hydrograph model, version 2
SFRA:	Strategic Flood Risk Assessment

1.0 INTRODUCTION

1.1. JOC Consultants Ltd is instructed by Gleeson Regeneration Ltd (the Client), to prepare this flood risk assessment (FRA) for a proposed housing development on land off West Moor Croft, south of Barnburgh Lane, Goldthorpe. The development is the subject of a planning application to Barnsley MDC.

1.2. References in this report to "the site" are references to the site to which the planning application applies. Specific references to sources of information used in the report are shown in square brackets and are listed in section 11. Figure 1 is presented immediately following page 19 and the appendices follow thereafter.

1.3. This report is prepared specifically for the Client for the purpose of the aforementioned planning application and the report may not be used for any purpose other than for the purpose for which it was commissioned, and it may not be assigned to any third party without our written permission.

1.4. In the preparation of this FRA report, JOC Consultants Ltd has relied on published information and by information provided by the Client and accepts no liability for its accuracy or adequacy or for the consequences of any changes to or re-assessment of this data in the future.

2.0 OBJECTIVES

2.1. The objectives of this flood risk assessment are to:

1. establish whether the proposed development is likely to be affected by current or future flooding from any source;
2. establish whether the proposed development will increase flood risk elsewhere; and
3. recommend, as appropriate, measures for managing flood risk.

3.0 PLANNING POLICY ON FLOOD RISK

3.1 National Policy

3.1.1. National Planning Policy in relation to flood risk is set out in the National Planning Policy Framework (NPPF) [1].

3.2 Local Policy

3.2.1. Local planning policy is defined in the Local Plan, adopted in January 2019 [2]. The site is identified on the Policies Map as allocated for housing under reference HS45.

3.2.2. Policies CC3 and CC4 define the local planning policy on flood risk and sustainable drainage respectively and these policies reflect the requirements of the NPPF.

3.2.3. Policy CC4 states:

3.2.4. 'Detailed planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how SuDS will operate, be managed and maintained for the lifetime of the development.'

3.2.5. Local policy on flood risk is informed by the Strategic Flood Risk Assessment [3].

3.3 Planning Practice Guidance

3.3.1. In addition to national and local policy, the Planning Practice Guidance for Flood Risk and Coastal Change [4] provides advice to planning authorities to assist them when considering planning applications in areas at risk of flooding. The Environment Agency Standing Advice [5] also provides guidance to assist local planning authorities when considering planning applications in areas at risk of flooding.

3.3.2. This report has been prepared with reference to the Planning Practice Guidance and the Standing Advice.

4.0 LOCATION AND DESCRIPTION OF THE SITE

4.1. The site is located to the south of Barnburgh Lane and to the west of West Moor Croft, as shown outlined in red in Figure 1. The coordinates at the approximate centre of the site are 446565, 403690.

4.2. Site inspections were made on 22nd October and 26th October 2020. Observations arising from these inspections are provided in subsequent sections of this report.

4.3. The site is a field, heavily overgrown with long grass and dense vegetation. There are shallow ditches along the west and southern boundaries, but these are not interconnected.

4.4. A 525mm concrete surface water sewer issues into the western ditch towards the north-west corner of the site. This sewer has no outfall headwall and the pipe appears to have settled to approximately 90% of its diameter. It is therefore blocked with soil which prevents water from discharging freely. Water merely seeps out into the ditch where it ponds immediately in front of the pipe before seeping into the ground. Further downstream, the ditch was observed to be dry and heavily overgrown.

4.5. The topographical survey plan in Appendix A shows ground levels to fall towards the south-east corner within the range 26.60m to 19.15m AOD.

4.6. The BGS Geology of Britain database identifies the bedrock to be the Pennine Middle Coal Measures – Mudstone, Siltstone and Sandstone. The database has no record of the superficial deposits but a heavy clay soil was observed during the site inspections.

4.7. The nearest watercourse flows south from the south-east corner of the site. This watercourse is understood from maps to flow into Far Moor Dike, approximately 375m south of the site.

4.8. West Moor Dike is approximately 430m to the east of the site. These watercourses are Ordinary Watercourses and there are no Main Rivers within 20m of the site.

4.9. In addition to the 525mm diameter surface water sewer, a 450mm diameter combined sewer crosses the northern part of the site from east to west, as shown in the Yorkshire Water sewer plan in Appendix B.

4.10. There are no reservoirs in the vicinity of the site.

4.11. The site is not in an Environment Agency Flood Warning or Flood Alert area.

5.0 THE PROPOSED DEVELOPMENT

5.1. The development forms phase 3 of the West Moor Croft housing development to the immediate east. Sixty nine houses are proposed with access from West Moor Croft as shown on the planning layout drawing in Appendix C.

5.2. The development is **Major Development** classified as **'More Vulnerable'**, in accordance with Table 2 of the Planning Practice Guidance for Flood Risk and Coastal Change, paragraph 066.

5.3. A preliminary drainage layout has been prepared by James Eaton Design Ltd. This proposes that surface water from the development is discharged into the existing 750mm diameter surface water sewer which conveys surface water from the approved phase 1 and phase 2 developments to the watercourse going south from the site. This is discussed in section 9 of this report.

6.0 EXISTING FLOOD RISK

6.1 Assessment methodology

6.1.1. The development and proposed or recommended mitigation measures are assessed against the Design Flood, as defined in PPG paragraph 055 [4], taking into account existing flood defences. In the context of fluvial flooding, the Design Flood is the flood event which has an annual exceedance probability (AEP) of 1%.

6.1.2. Events which exceed the Design Flood, and identified uncertainties are assessed as residual risks.

6.1.3. Surface water runoff rates and volumes were estimated using FEH 2013 rainfall data and the REFH2 model software. The REFH2 methodology uses catchment descriptors and regression equations to generate flow hydrographs where no flow records are available.

6.1.4. The risk to the development from surface water flooding was assessed using the Updated Surface Water Flood Map and with reference to observations on site.

6.2 History of Flooding

6.2.1. There is no available evidence of historic or potential flooding of the site. In view of the absence of a suitable conveyance route for surface water from the 525mm diameter sewer however, it is very likely that this will have caused flooding of the site in the past.

6.3 Flood zones

6.3.1. The Flood Map for Planning shows the site to be in Flood Zone 1, as shown in Appendix D.

6.4 Flood warning

6.4.1. The site is not in a Flood Warning or Flood Alert area.

6.5 Fluvial flood risk

6.5.1. The annual exceedance probability of fluvial flooding less than 0.1%, as indicated by the flood map.

6.6 Surface water flood risk

6.6.1. The Updated Surface Water Flood Map in Appendix E shows the site to be at a very low risk of surface water flooding with no depths indicated. As noted above however, there is a potential risk of flooding to the site from the 525mm surface water sewer. Should the blockage in this sewer be removed, there is the potential for a large volume of water to enter the ditch at the western boundary of the site.

6.6.2. The sewer drains the developed area to the south of Frederick Street, between Albert Road and the eastern end of Frederick Street; Barnburgh Lane between these points; and Risedale Road, Lindale Gardens and Derwent Gardens. The gross area amounts to approximately 7.45ha, but it is estimated from the sewer map that only approximately 2.64 ha are connected to the surface water sewer. The sewer map shows that part of the area is connected to the combined sewer.

6.7 Risk of sewer flooding

6.7.1. Flooding from sewers can occur, typically at low points in the ground level when:

- the capacity of the sewer is exceeded; and/or
- the sewer is blocked.

6.7.2. Current drainage practice is for sewers to be designed to ensure no surface flooding in a 3.3% AEP rainfall event and no flooding of buildings in a 1% AEP rainfall event.

6.7.3. The risk of flooding from the new sewers within the development is therefore assessed to be medium to low, but the 525mm diameter surface water sewer represents a potentially high risk of flooding to the site. Yorkshire Water and the LLFA have been notified and this matter is currently under investigation.

6.8 Risk of groundwater flooding

6.8.1. Groundwater flooding of land occurs when the water table rises above the ground surface or enters basements and is typically associated with permeable rock. These conditions are not present at the site. Should the water level in the western ditch approach ground level, the

soil within the site would become saturated and there could be emergence of water in low spots. Resolving the problem of the inadequate outfall and flow conveyance route from the 525mm surface water sewer would reduce the risk of groundwater flooding.

6.9 Risk of flooding from reservoirs and canals

6.9.1. The site is not in an area at risk of flooding from reservoirs or canals (see Appendix F).

7.0 EFFECTS OF CLIMATE CHANGE

7.1 Climate change allowances

7.1.1. The effects of climate change must be assessed over the lifetime of the development. The Planning Practice Guidance states at paragraph 026 that residential development should be considered for a minimum period of 100 years. For the purposes of this assessment, climate change effects are therefore considered up to the year 2120.

7.1.2. Current guidance on climate change, updated on 22nd July 2020, [6] provides the anticipated changes to peak river flow and rainfall intensity for different scenarios of carbon dioxide emissions over future epochs up to 2115. Climate change allowances are provided for each river basin district in England and now include an allowance for extreme climate change scenarios, denoted as 'H++'. The Environment Agency requires this to be considered when assessing the effects of climate change on new development.

7.2 Peak river flow allowances

7.2.1. The effects of climate change on peak river flow are not relevant to this FRA as the site is not at risk from fluvial flooding.

7.3 Peak rainfall intensity

7.3.1. The climate change guidance requires the Central and Upper End allowances to be used when assessing the effects of increases to peak rainfall intensity. The allowances apply across the whole of England and are shown in Table 7.1 for the period 2070 to 2115.

Table 7.1: Total percentage change in peak rainfall intensity in the period 2070 - 2115	
Allowance Category	Climate change effect
Upper end	40%
Central	20%

7.3.2.

7.3.3. The above allowances should be applied in the detailed design of the drainage system for the development.

8.0 EFFECT OF THE DEVELOPMENT ON FLOOD RISK

8.1 Effect on the site

8.1.1. For the purposes of this FRA it is assumed that the development will convert approximately 50% of the site to impervious area. This is a conservative assumption as in most Gleeson developments the impervious area amounts to less than 50%.

8.1.2. The REFH2 estimates of surface water runoff rates and volumes in the existing and post-development conditions are provided in Appendix G. In the pre-development condition, the winter rainfall profile is appropriate, based on the urban extent. In the post development condition however, the summer rainfall profile is appropriate. The effect of the development on runoff rates and volumes is therefore assessed by comparing the post development runoff rates and volumes resulting from the summer rainfall profile, with the greenfield rates and volumes resulting from the winter rainfall profile.

8.1.3. The 2 year rural peak flow rate (Q MED) is 5.25 l/s for the site. As the site is in Hydrological Area 3, the growth curve factor used to convert Q bar to Q(T) is 0.94. Q bar is therefore estimated to be 5.59 l/s, as shown in Appendix G.

8.1.4. The REFH2 results show that the development will increase peak runoff rates and volumes, on average, by factors of 2.8 and 1.8 respectively.

8.2 Effect on the watercourse

8.2.1. The approved Phase 1 and Phase 2 developments discharge surface water at an uncontrolled rate to the watercourse which flows south from the site to Farm Moor Dyke. In order to mitigate the effect of this, the capacity of the watercourse was increased and V-notch weirs were installed in order to restrict the flow rate in the watercourse and to utilise

the increased channel capacity for attenuation storage. It is understood that this was approved by the LLFA.

8.2.2. The watercourse flows through agricultural fields where crops are grown. It is therefore important that the drainage arrangements for the development do not cause water-logging of the fields as this can impair crop growth by inhibiting gaseous exchange within the root zone. Crop damage is dependent on the duration of waterlogging and the age of the crop. Waterlogging of the root zone for 2 to 3 days can be fatal to young plants but may cause relatively little damage to a vigorous, established crop. As a general guide, the water table in the field should not be within 600mm of the ground surface.

8.2.3. Estimated catchment area

8.2.4. The catchment area of the watercourse going south from the site is shown as 65ha in the FEA catchment data and includes a large area extending north to Phoenix Park. Inspection of Yorkshire Water sewer maps however, reveals that much of this area is drained by sewers which do not contribute flow to the watercourse. The catchment area of 65ha is therefore considered to be incorrect.

8.2.5. The actual catchment area is estimated to be approximately 32.06ha, as shown in Table 8.1.

Table 8.1: Estimated catchment area of the watercourse south of the site

Area	Total catchment ha	Urban catchment ha
Development sites: phases 1 to 3	7.71	3.86
525mm dia. surface water sewer catchment	7.45	2.64
Rural catchment	16.90	0.00
Total	32.06	6.50

8.2.6.

8.2.7. The blocked 525mm diameter surface water sewer is not currently contributing peak flows to the watercourse, so the net catchment area is approximately 24.61ha of which approximately 3.86ha is estimated to have an impervious surface.

8.2.8. Preliminary estimates of peak flow rates and volumes from the catchment were made using FEH point data and the REFH2 model and the results are provided in Appendix H. Table 8.2

shows the estimated peak flow rates from the catchment area and the runoff volumes are shown in Table 8.3.

Table 8.2: Peak flow rates from the catchment area of the watercourse l/s

8.2.9. Event AEP	8.2.10. Total catchment	8.2.11. YW sewer catchment	8.2.12. Catchment excluding sewer
1	107.12	31.91	75.21
2	121.92	36.35	85.57
100	387.99	114.72	273.27

8.2.13.

Table 8.3: Runoff volumes from the catchment area of the watercourse m^3

8.2.14. Event AEP	8.2.15. Total catchment	8.2.16. YW sewer catchment	8.2.17. Catchment excluding sewer
1	1350.04	403.50	946.54
2	1545.62	461.35	1084.27
100	5100.41	1490.27	3610.14

8.2.18.

8.2.19. The capacity of the watercourse, based on its existing geometry is estimated to be approximately 4.76 m^3/s, as shown in the calculation in Appendix I. There is therefore sufficient capacity to pass the 1% AEP flow rate from the total catchment, taking into account the urbanisation. The effect of the proposed drainage scheme on the watercourse is discussed in section 9.1 below.

9.0 FLOOD RISK MANAGEMENT

9.1 Fluvial flood risk

9.1.1. The use of the watercourse to provide attenuation storage for the phase 1 and phase 2 developments was approved subject to limiting the peak discharge rate passing downstream to Far Moor Dike to 5 l/s per ha. It is proposed to maintain this constraint with the addition of

the surface water runoff from the phase 3 development. For a catchment area of 24.61ha the controlled discharge rate should therefore be limited to 123.05 l/s.

9.1.2. The drainage strategy proposes an uncontrolled surface water discharge to the existing 750mm sewer which discharges to the ordinary water course close to the south east corner of the site. The capacity of the watercourse was increased in order to provide attenuation storage for the phase 1 and phase 2 developments. The drainage strategy proposes the removal of the V-notch weirs and the installation of a flow control orifice at the location of the downstream V-notch weir.

9.1.3. James Eaton Design Ltd has modelled the input flow rates for a range of rainfall events using Micro Drainage from which an orifice diameter of 299mm was determined. Table 9.1 provides a summary of the Micro drainage results which are provided in Appendix J. The freeboard is based on an overtopping threshold of 18.40m AOD.

Table 9.1: Summary of Micro Drainage results by James Eaton Design Ltd

9.1.4. Event AEP	9.1.5. Discharge through orifice l/s	9.1.6. Freeboard* mm
1	39.3	864
30	88.6	700
100_30% CCA	122.5	481

* Distance from top of channel to water surface

9.1.7. The discharge rates are based on the net catchment area excluding the 525mm surface water sewer catchment area which does not currently contribute peak flow rates to the watercourse.

9.2 Surface water flood risk

9.2.1. The surface water flooding risk identified in section 6.6 of this report can be mitigated by extending the 525mm surface water sewer to a suitable outfall. As it is not currently contributing peak flow to the watercourse going south from the site, and in view of the use of that watercourse to balance surface water flows from the development, including the previous two phases, it would be preferable for the 525mm diameter sewer to be extended to an outfall at Far Moor Dike. Should the outfall be at the watercourse going south from the site however, it would be necessary to account for the additional peak flow by increasing the

orifice diameter to limit the forward flow to a total discharge based on the uncontrolled flow from the 525mm diameter sewer plus the 5 l/s per ha flow rate from the three phases of the development. These are matters that will need to be discussed with Yorkshire Water, the LLFA and the IDB.

9.2.2. It is recommended that finished floor levels are reviewed when the detailed design of the drainage system is prepared and raised 300mm above any surface water flooding that occurs in events having an AEP less than 3.3%.

9.3 Residual risks

9.3.1. Residual risks are those that remain after the implementation of the flood risk management measures. The risk of a 40% increase in peak rainfall due to climate change should be considered in the drainage design calculations and the effect of this on the proposed drainage scheme should be assessed. Additional measures may be required to mitigate this residual risk.

9.3.2. In the event of the design rainfall event being exceeded, there are likely to be overland exceedance flows. These flows should be managed in designed overland flow routes which should be shown on the drainage plans. The exceedance flow routes should be designed to ensure there is no flooding to buildings in the event that they occur.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

10.1.1. The development is classified as ‘more vulnerable’ and has an assumed lifetime of 100 years, in accordance with the current Planning Practice Guidance for Flood Risk and Coastal Change.

10.1.2. The development is in flood zone 1 which indicates an annual chance of fluvial flooding less than 0.1%.

10.1.3. There is no known history of flooding at the site of the development. It is likely however that the site may have been flooded in the past by water from the 525mm surface water sewer which discharges to the ditch close to the north-west corner of the site. As the ditch is not connected to the ditch at the southern boundary, or to the watercourse going south from the site, there is no conveyance route for this discharge except across the site in high flow events.

10.1.4. The 525mm surface water sewer has settled to approximately 90% of its diameter and is blocked with soil which currently limits the discharge, thereby increasing flood risk further upstream. Rectification of this defect is a matter for Yorkshire Water which has been informed of the defect.

10.1.5. Although the Updated Surface Water Flood Map indicates a very low risk of surface water flooding, this does not reflect the risk of flooding from the 525mm surface water sewer which could occur when the existing blockage is removed.

10.1.6. Groundwater flooding is unlikely but there could be emergence of perched water at low spots when the ground is saturated as a consequence of the discharge from the 525mm surface water sewer. This risk will be minimised when the sewer defect is rectified and when the site is prepared for development.

10.1.7. It is estimated that the development will increase surface water runoff rates and volumes by factors of approximately 2.8 and 1.8 respectively. This will be mitigated by limiting the flow rate in the watercourse to 5 l/s per ha, and by utilising the increased capacity of the watercourse, provided for the phase 1 and phase 2 developments, for attenuation storage. This is consistent with the approved approach adopted for the phase 1 and phase 2 developments.

10.1.8. The Micro Drainage analysis by James Eaton Design Ltd shows that the water level in the watercourse does not rise to within 600mm of the top of the channel in a 1% AEP with a 30% CCA, except in the vicinity of the orifice flow control structure, where it rises to approximately 480mm below the top of the channel. This is considered to be acceptable provided it is an occurrence of short duration.

10.1.9. The 525mm surface water sewer will need to be extended by Yorkshire Water to a suitable outfall structure, preferably at Far Moor Dike. Should the outfall be placed at the watercourse to the south of the site however, it will be necessary to account for the additional peak flow by increasing the orifice diameter to limit the forward flow to a total discharge based on the uncontrolled flow from the 525mm diameter sewer plus the 5 l/s per ha flow rate from the three phases of the development.

10.2 Recommendations

10.2.1. It is recommended that:

- the 525mm surface water sewer is extended by Yorkshire Water to a suitable outfall, preferably at Far Moor Dike, prior to construction of the development;
- the effect of a 40% CCA is considered in the drainage scheme analysis and mitigation of this risk is provided;
- finished floor levels are reviewed when the detailed drainage design is prepared and raised 300mm above any surface water flooding that occurs in events having an AEP less than 3.3%;
- exceedance flows routes are designed into the drainage scheme to ensure no flooding of buildings in the event of exceedance flows; and
- a SuDS design statement is prepared and submitted with the detailed drainage plan as part of the planning application documents, in accordance with planning policy requirements.

11.0 REFERENCES

1. National Planning Policy Framework. Department for Communities and Local Government. February 2019.

2. Barnsley Local Plan, Adopted January 2019.

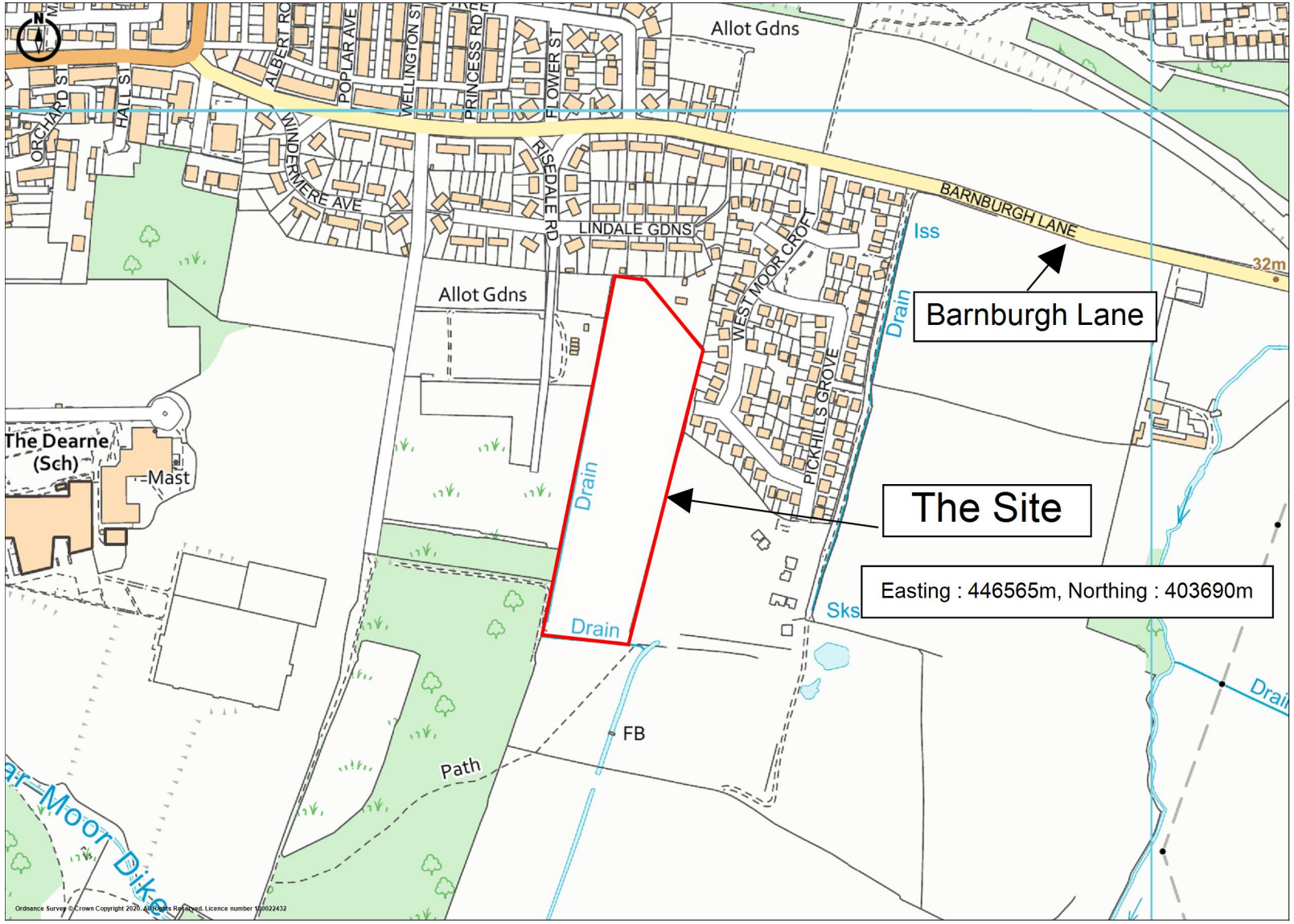
3. Barnsley Level 1 SFRA, September 2010.

4. Planning Practice Guidance: Flood Risk and Coastal Change. Updated 15th April 2015. Department for Communities and Local Government.

5. Environment Agency Standing Advice to local planning authorities. April 2015.

6. Flood risk assessments: climate change allowances. Environment Agency, 19th February 2016, updated 22nd July 2020.

Barnburgh Lane, Goldthorpe Phase 3



Promap V2
LANDMARK INFORMATION

Ordnance Survey © Crown Copyright 2020. All Rights Reserved.
Licence number 100022432
Plotted Scale - **1:5000**. Paper Size - **A4**

Figure 1: Location Plan

APPENDIX A

Topographical survey plan

Haycock+Todd
Land Survey Consultants Architectural Surveyors

The Hollies, 43 Church Street, Royston,
Barnsley, S71 4QU. T:01226 709630
E:info@land-surveying.co.uk W:land-surveying.co.uk

Site Survey

Goldthorpe, Barnburgh View, Phase 3.

Sheet 1 of 1	Surveyed by SH
Datum	Drawn by SH
GRID– Related to Ordnance Survey using One Point Localisation on Station S3. Orientation at OS Grid North.	Date of Survey February 2020
	Scale 1/200
LEVEL– Related to Ordnance Survey by connection to the OS Active Network by G.P.S	Survey Job No. S9601

LEGEND

Manhole shown thus	MH
Inspection Cover	IC
Lamp post	LP
Gully	G
Lampost	LP
Telegraph Pole	TP
Electricity Pole	EP
Road Traffic Signs	RS
Traffic Lights	TL
British Telecom	BT
Cable Television	CATV
Fire Hydrant	FH
Safety Valve	SV
Stop tap Water	W
Stopcock Gas	Gas
Unknown Stoptap	ST

Floor Level	FL 10.907
Height floor to ceiling	C 2.22
Height floor to struct soffit	SS 2.87
Height floor to false ceiling	FC 2.22
Height floor to sill	S0.67
Height sill to window head	W1.23
Height of Door	D1.98
Height floor to underside	US 3.61
Ceiling Slopes Up	csu
Height floor to Arch	Ar2.99
Height floor to Arch Spring	Sp2.67
Vent	VP
Fall Pipe	FP
Sky Light	SL
Water Closet	WC
Sink	S
Boxed Column	B

446700E
403550N

APPENDIX B

Yorkshire Water sewer plans

Drain
Underpass
Drain
A635
Drain
Drain
Allot Gdns
Mast
PW
Allot Gdns
Sch
LOCKWOOD ROAD
Goldthorpe Primary School
ST MARY'S RD
KATHLEEN GR
MORA STREET
EAST STREET
MAIN ST
HAMILTON RD
Allot Gdns
DONCASTER ROAD
PICKHILL AVENUE
B6098
KING STREET
WEST ST
MAIN ST
ELIZABETH ST
QUEEN STREET
GOSLING GATE ROAD
KELLY STREET
Liby
Recreation Ground
Track
Allot Gdns
54m
CO-OPERATIVE STREET
VICTORIA STREET
PW
CROSS ST
BARNSLEY RD
Pol Sta
PW
PO
MARKET ST
Market
JACKSON ST
MARKET
BEEVER ST
KINGSMARK WAY
PARKGATE
FB

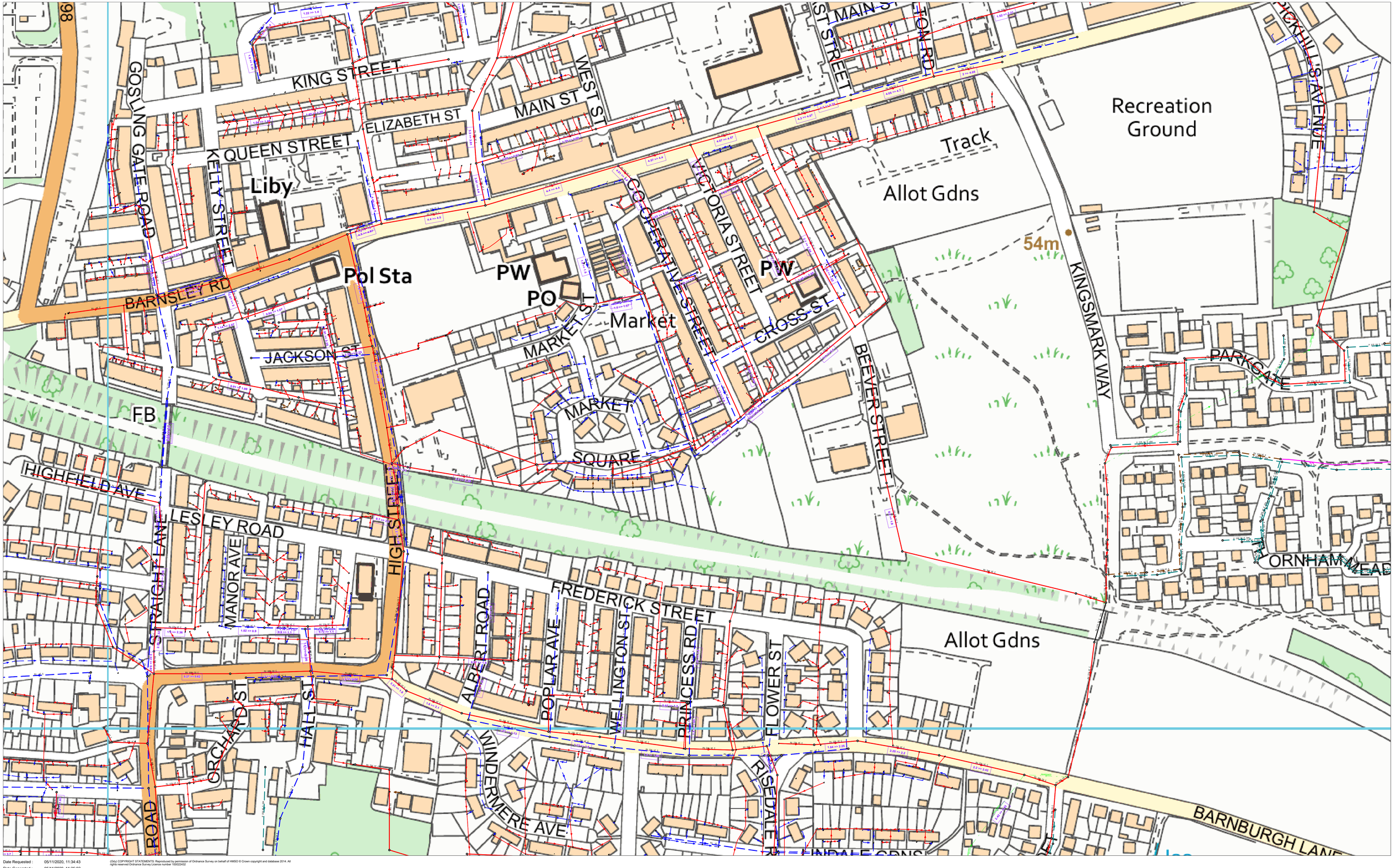
Date Requested : 05/11/2020, 11:39:03
Date Generated : 05/11/2020, 11:39:20

Scale: 1:1250

The position and depth of any YW apparatus shown on this map are approximate only.

UPN: Undefined

Originator: S P Midgley, Waste Water Technical, 75 4486



Date Requested : 05/11/2020, 11:34:43

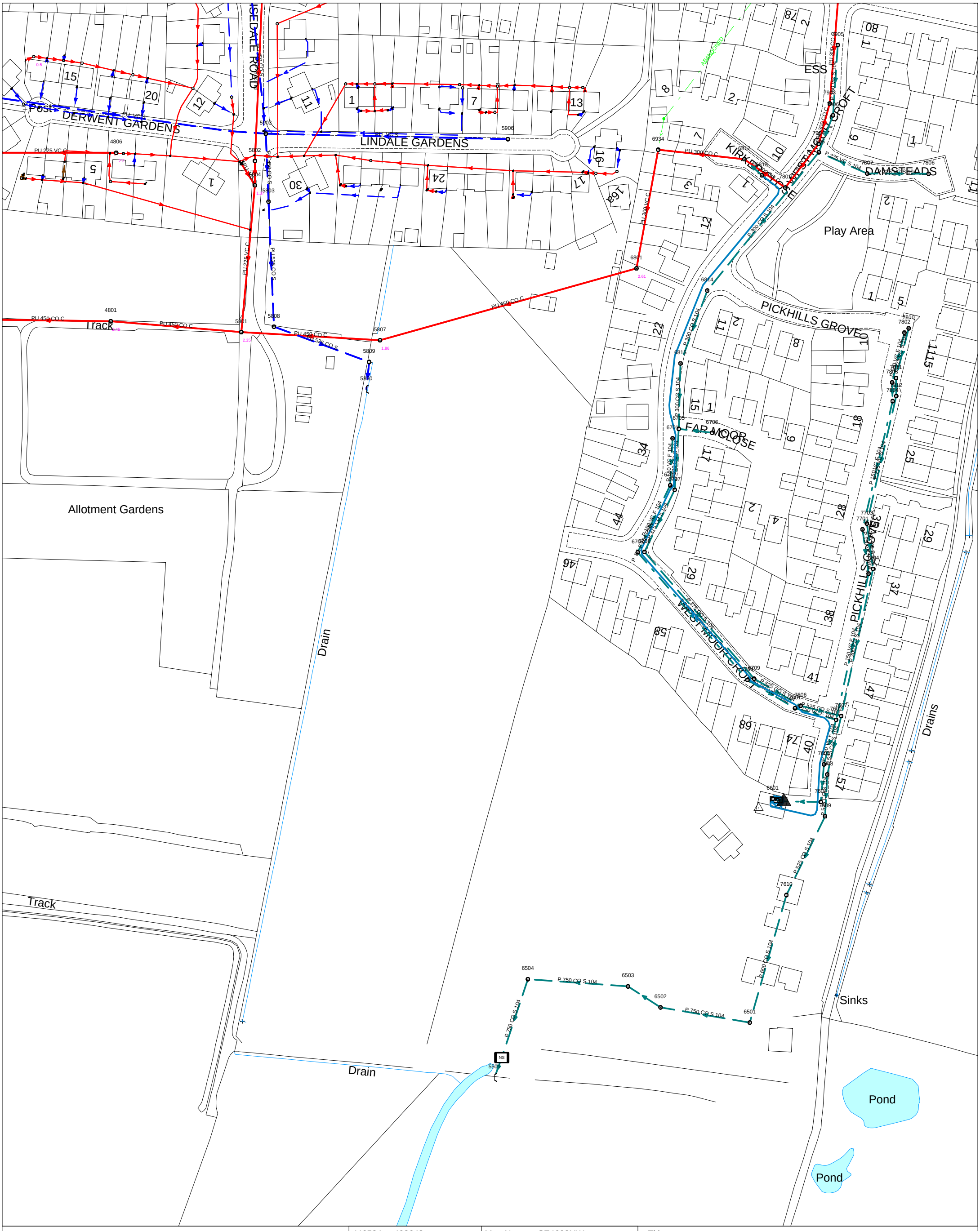
Date Generated : 05/11/2020, 11:35:02

Scale : 1:1250

The position and depth of any YW apparatus shown on this map are approximate only.

UPN: Undefined

Originator: S P Midgley, Waste Water Technical, 75 4486



446524 : 403643	Map Name : SE4603NW	Title
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 Partially 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 : 24/08/2020, 13:15:37	Date Gen : 24/08/2020, 13:18:52
	Source : Sewer Network Enquiry	

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

APPENDIX C

Planning layout drawing – revision D

Existing tree to be removed

Existing tree to be retained and protected during construction to British Standard 5837:1991.

Areas of new tree planting see schedule for species

New shurbs/ ground cover planting

Grass to front garden

Paving slab access paths to level threshold for principle entrance. Gradient not to exceed 1in 12 for maximum 5.00m length

S.W. boarded vertical screen fence 1.80m high (100 x 22mm boards with 22mm gaps, 3No. 75 x 38mm rails, 100 x 100mm posts @ 1.875m centres).

Plot division fence, 1.20m high timber.

201 House type code reference number

10 Plot number

Garages location.

Parking bays

S SO Show house & Sales office

HOUSE TYPE code	type	no
201	2 bed semi det./ terr	5
202	2 bed semi det.	6
212	2 bed semi det.	2
301	3 bed semi det.	6
304	3 bed detached	11
309	3 bed semi det.	9
311	3 bed semi det.	3
313	3 bed semi det.	3
314	3 bed detached	5
315	3 bed detached	7
401	4 bed detached	6
405	4 bed detached	6
TOTAL		69

- NOT FOR USE ON SITE -
PROVISIONAL LAYOUT DRAWING, SUBJECT TO PLANNING APPROVAL

gleeson

Richard Ward Design

Chartered Architectural Technologist
Architectural Design & Development Consultant

Richard S. Ward
M.C.I.A.T.
Telephone 01604 410943

2. Burtram Close
Weston Favell
Northampton NN3 3PH

BARNBURGH LANE GOLDTHORPE Ph.3

planning layout

GLEESON HOMES & REGENERATION

A.	Existing sewer position added, plots 55-62 revised to suit. 09.06.20	Scale
B.	Plots 11-19 revised, reduction of one plot and the rest of the development re-numbered. Road adj to P 57 shortened and 62-69 moved towards access road. Shared surface re-positioned adj P18/32. Visitors parking, footpath link through open space and chicane road narrowing added. 18.09.20	1:500 at A1
C.	Detail to pump station and access added.	Date
D.	Footpath route revised. Garage to plots 27&59 omitted, drives revised. 18.09.20	13.03.20
	Garage to P26 moved forward, paired with P25 garage to avoid proposed sewer. 19.10.20	Dwg No 1014/3C

APPENDIX D

Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
20/022	**446565/403690**	**21 Aug 2020 16:41**

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

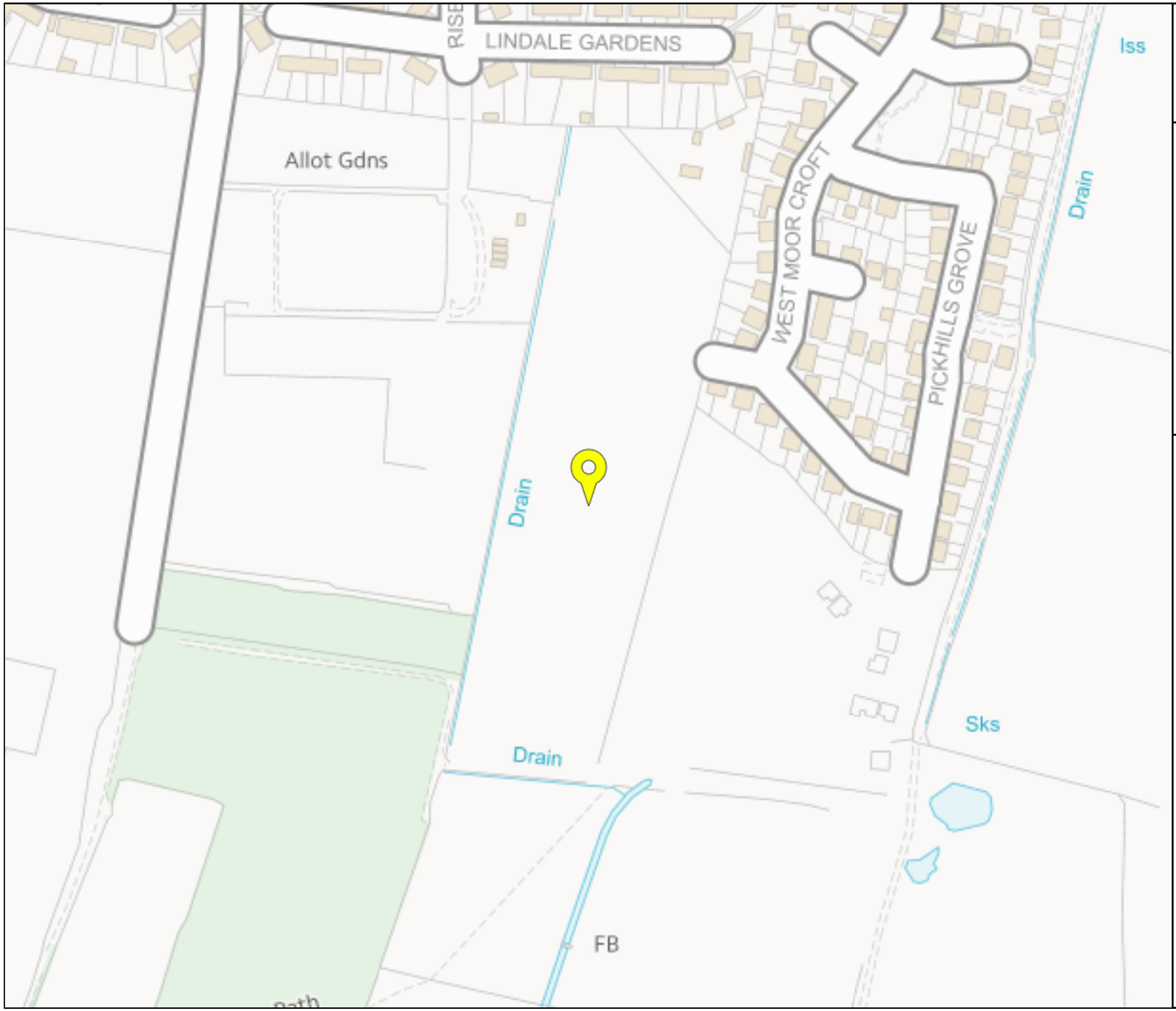
This means:

- 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.



Environment Agency

Flood map for planning

Your reference
20/022

Location (easting/northing)
446565/403690

Scale
1:2500

Created
21 Aug 2020 16:41

- 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

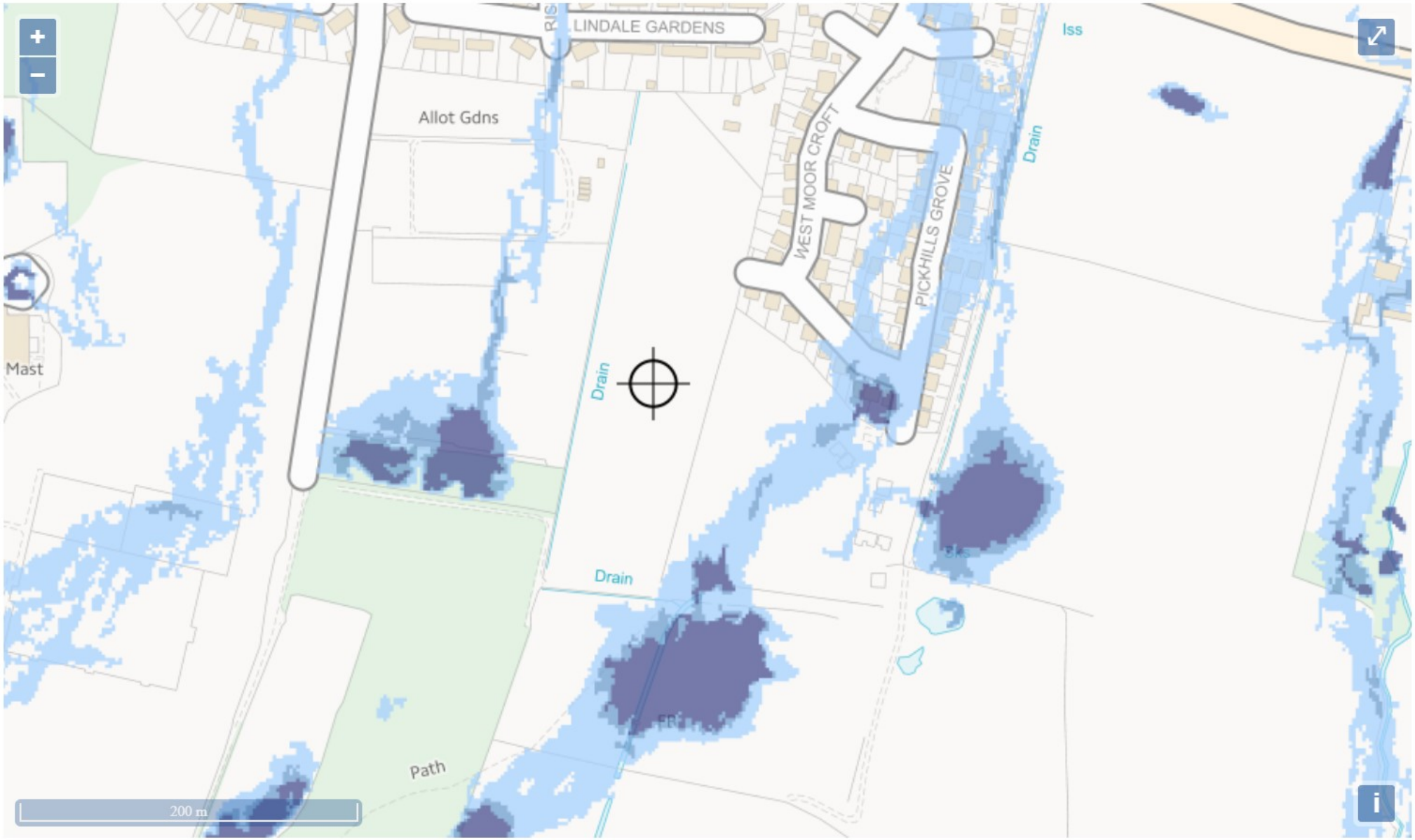
0 20 40 60m

APPENDIX E

Surface water flood maps

Extent of flooding

Barnburgh Lane, Goldthorpe

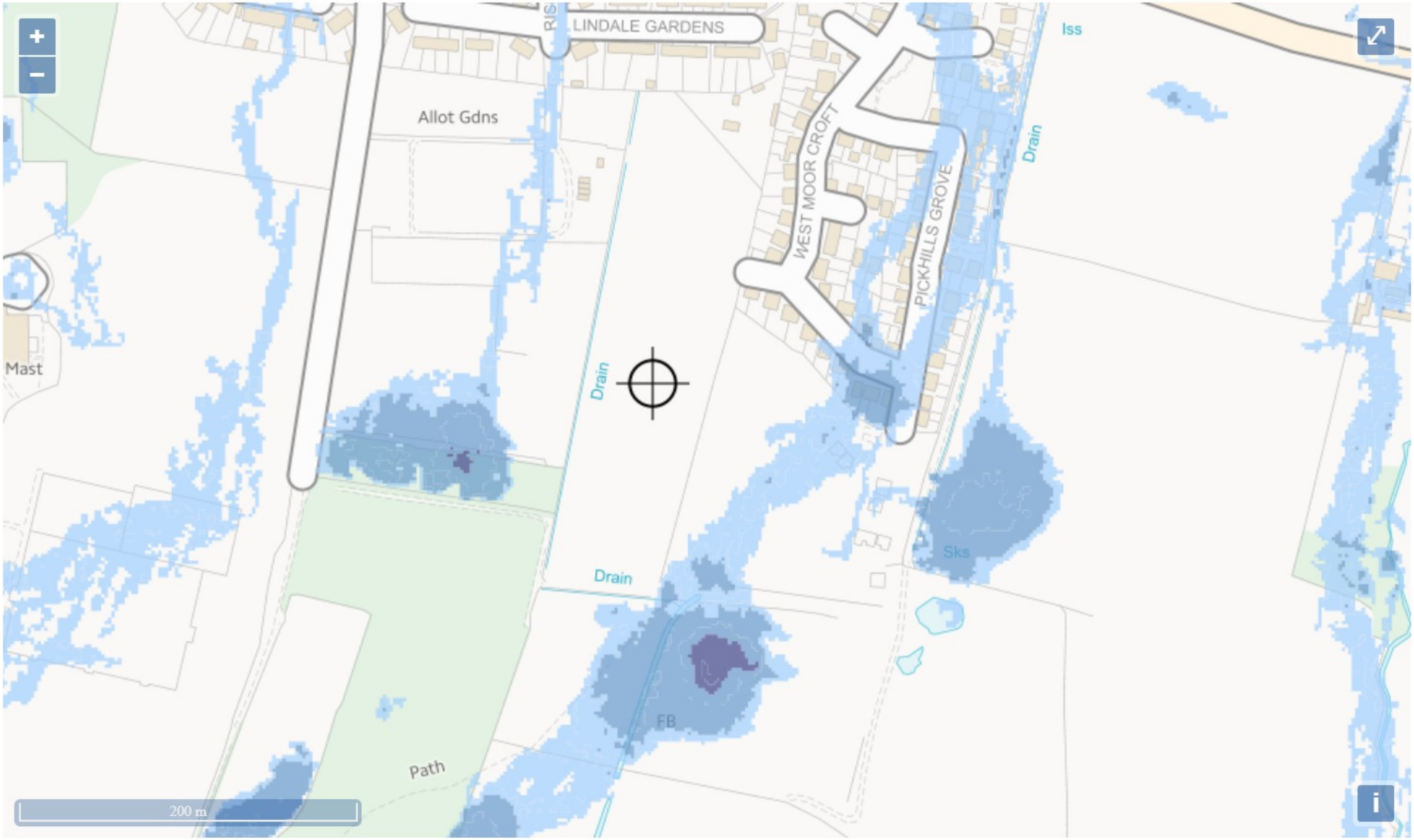


Extent of flooding from surface water

High Medium Low Very low Location you selected

Low risk: depth

Barnburgh Lane, Goldthorpe



Surface water flood risk: water depth in a low risk scenario

Flood depth (millimetres)

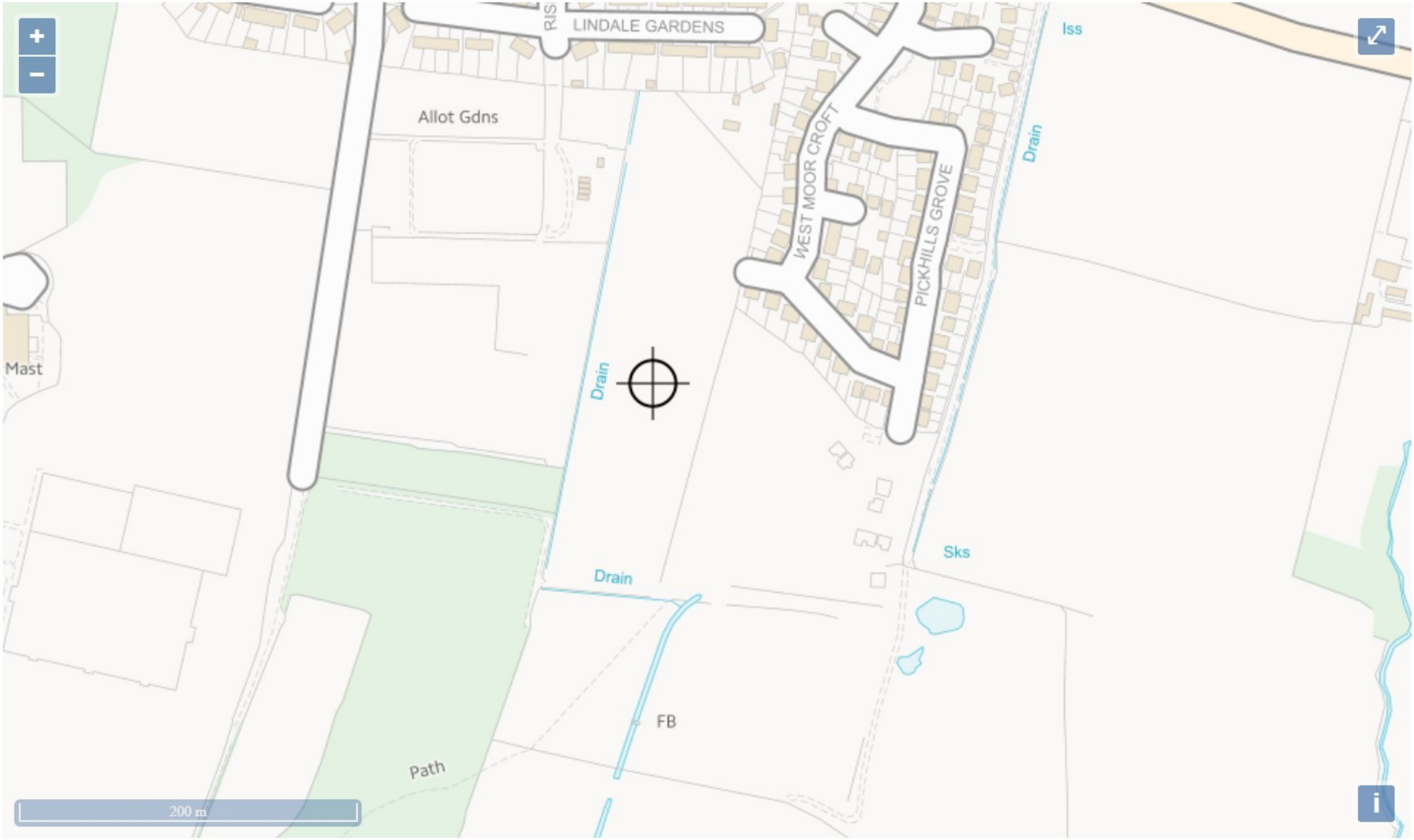
Over 900mm | 300 to 900mm | Below 300mm | Location you selected

APPENDIX F

Reservoirs flood map

Extent of flooding

Barnburgh Lane, Goldthorpe



Extent of flooding from reservoirs

Maximum extent of flooding Location you selected

APPENDIX G

REFH2 estimates of peak runoff rates and volumes from the site

APPENDIX G: ReFH2 results: Existing greenfield condition

Gross area	2.21	ha
Impervious	0.00	ha
Hydrological area	3	

Return period (yrs)	Urbanised peak flow (l/s)	Urbanised direct runoff (m^3)	As-rural peak flow (l/s)	As-rural direct runnoff (m^3)
1	4.62	57.05	4.62	57.05
2	5.25	65.55	5.25	65.55
5	7.43	95.09	7.43	95.09
10	9.12	118.06	9.12	118.06
30	12.27	161.19	12.27	161.19
50	14.09	186.28	14.09	186.28
75	15.80	209.80	15.80	209.80
100	17.17	228.83	17.17	228.83
100_20% CCA	21.11	283.39	21.11	283.39
100_40% CCA	25.24	340.89	25.24	340.89
200	21.13	283.72	21.13	283.72
1000	33.27	453.42	33.27	453.42

Q MED greenfield:	5.25	l/s
Growth curve factor	0.94	FSSR 14
Q bar	5.59	l/s

APPENDIX G: ReFH2 results: Post development condition

Gross area	2.21	ha
Impervious	1.105	ha
Hydrological area	3	

Return period (yrs)	Urbanised peak flow (l/s)	Urbanised direct runoff (m^3)	As-rural peak flow (l/s)	As-rural direct runnof (m^3)	% increase in peak flow rate	% increase in volume
1	17.82	216.99	5.51	66.25	285%	228%
2	20.34	248.13	6.32	76.76	287%	223%
5	28.90	354.29	9.22	114.37	289%	210%
10	35.36	434.84	11.52	144.68	288%	201%
30	47.08	581.94	15.97	203.83	284%	185%
50	53.69	665.28	18.62	239.43	281%	178%
75	59.75	742.10	21.15	273.51	278%	171%
100	64.57	803.36	23.22	301.55	276%	166%
100_20% CCA	78.01	975.12	29.26	384.04	270%	154%
100_40% CCA	91.63	1150.58	35.80	473.93	263%	143%
200	78.09	976.14	29.30	384.55	269%	154%
1000	116.99	1480.43	48.99	657.10	252%	125%
				Average:	277%	178%

Q MED greenfield:	5.25	l/s
Growth curve factor	0.94	FSSR 14
Q bar	5.59	l/s

APPENDIX H

REFH2 estimates of peak runoff rates and volumes from the watercourse catchment

APPENDIX H: ReFH2 results: watercourse catchment including YW sewer catchment

Description	Urbanised peak flow (l/s)	Urbanised direct runoff (m^3)	As-rural peak flow (l/s)	As-rural direct runnoff (m^3)
1 year	107.12	1350.04	67.51	833.35
2 year	121.92	1545.62	76.70	957.57
5 year	172.49	2215.54	108.52	1389.23
10 year	210.95	2727.11	133.16	1725.01
30 year	281.42	3668.15	179.22	2355.64
50 year	321.46	4205.07	205.90	2722.52
75 year	358.45	4702.35	230.85	3066.64
100 year	387.99	5100.41	250.99	3344.96
100 year 1.2 CC	471.07	6223.61	308.55	4143.30
100 year 1.4 CC	556.27	7381.18	368.95	4984.74
200 year	471.56	6230.28	308.90	4148.09
1000 year	717.32	9583.02	486.51	6632.02

APPENDIX H: ReFH2 results: watercourse catchment excluding YW sewer catchment

Description	Return period (yrs)	Urbanised peak flow (l/s)	Urbanised direct runoff (m^3)	As-rural peak flow (l/s)	As-rural direct runnoff (m^3)
1 year	1	75.21	946.54	51.82	639.70
2 year	2	85.57	1084.27	58.87	735.05
5 year	5	121.04	1557.11	83.30	1066.41
10 year	10	148.09	1919.25	102.22	1324.15
30 year	30	197.78	2587.67	137.57	1808.24
50 year	50	226.10	2970.27	158.05	2089.87
75 year	75	252.31	3325.38	177.21	2354.02
100 year	100	273.27	3610.14	192.67	2567.67
200 year	200	332.72	4420.67	237.12	3184.17
1000 year	1000	508.71	6843.33	373.46	5090.90

Whole catchment including sewer

	l/s	m^3
1	107.00	1350.00
2	121.92	1545.62
100	387.99	5100.41

YW sewer catchment

1	31.79	403.46
2	36.35	461.35
100	114.72	1490.27

APPENDIX I

Estimate of watercourse channel capacity under free flow conditions

20/022: Barnburgh Lane, Goldthorpe - Phase 3

Appendix I: Estimate of watercourse channel capacity under free flow conditions

Channel shape	Trapezoidal	
Side slopes: 1 in	2	
Bed width	2.00	m
Typical depth	1.00	m
Reach length	382.78	m
U/S IL	17.75	m AOD
D/S IL	17.27	m AOD
Fall	0.48	m
Bed slope (S_o)	0.0013	
Manning n	0.022	Clean straight channel with some weathering

Manning equation	$Q=AR^{2/3}S_o^{0.5}n^{-1}$

Area (A)	4.00	m^2
Wetted perimeter (P)	6.47	m
Hyrdaulic radius (R)	0.62	m
Flow rate (Q)	4.67	m^3/s

APPENDIX J

Micro Drainage Calculations by James Eaton Design Ltd

Stoneycroft
Brackenhill Ackworth
Pontefract WF7 7BG

Date 28/11/2020 13:23 | Designed by James
File GOLDTHORPE 3 SW.MDX | Checked by
Micro Drainage | Network 2020.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for GOLDTHORPE SW.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.376	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for GOLDTHORPE SW.SWS

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	25.973	0.935	27.8	0.074	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	14.745	0.743	19.8	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	22.860	0.152	150.4	0.060	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	19.261	0.128	150.5	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	65.443	1.691	38.7	0.118	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	28.658	2.275	12.6	0.072	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	24.104	1.630	14.8	0.058	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	12.514	0.159	78.7	0.028	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.23	31.794	0.074	0.0	0.0	0.0	1.92	33.9	10.0
1.001	50.00	5.33	30.859	0.106	0.0	0.0	0.0	2.27	40.1	14.4
2.000	50.00	5.36	28.672	0.060	0.0	0.0	0.0	1.06	42.3	8.1
2.001	50.00	5.66	28.520	0.082	0.0	0.0	0.0	1.06	42.3	11.1
1.002	50.00	6.09	28.317	0.306	0.0	0.0	0.0	2.54	179.2	41.4
1.003	50.00	6.20	26.626	0.378	0.0	0.0	0.0	4.45	314.8	51.2
1.004	50.00	6.30	24.351	0.436	0.0	0.0	0.0	4.11	290.5	59.0
3.000	50.00	5.14	22.954	0.028	0.0	0.0	0.0	1.48	58.7	3.8

Network Design Table for GOLDTHORPE SW.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.005	22.484	1.050	21.4	0.014	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	25.446	0.874	29.1	0.076	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	61.729	1.354	45.6	0.116	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	19.734	0.049	402.7	0.075	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	15.390	0.039	394.6	0.022	0.00	0.0	0.600	o	525	Pipe/Conduit	
4.000	22.962	0.303	75.8	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	11.388	0.143	79.6	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	18.694	0.714	26.2	0.098	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.003	6.757	0.310	21.8	0.008	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.004	48.325	2.177	22.2	0.089	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.005	16.801	0.851	19.7	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.006	55.387	2.015	27.5	0.070	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.010	22.090	0.045	490.9	0.046	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.011	15.492#	0.038	407.7	0.040	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.012	15.703	0.040	392.6	0.010	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.013	18.239	0.061	299.0	0.009	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.014	9.656	0.160	60.4	0.023	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	28.518	0.122	233.8	0.100	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	6.41	22.720	0.478	0.0	0.0	0.0	3.41	241.2	64.7
1.006	50.00	6.53	21.595	0.554	0.0	0.0	0.0	3.37	372.1	75.0
1.007	50.00	6.91	20.721	0.670	0.0	0.0	0.0	2.69	297.1	90.7
1.008	50.00	7.21	19.217	0.745	0.0	0.0	0.0	1.11	240.3	100.9
1.009	50.00	7.44	19.168	0.767	0.0	0.0	0.0	1.12	242.8	103.9
4.000	50.00	5.33	26.017	0.026	0.0	0.0	0.0	1.16	20.4	3.5
4.001	50.00	5.50	25.714	0.031	0.0	0.0	0.0	1.13	19.9	4.2
4.002	50.00	5.62	25.496	0.129	0.0	0.0	0.0	2.57	102.1	17.5
4.003	50.00	5.66	24.782	0.137	0.0	0.0	0.0	2.81	111.9	18.6
4.004	50.00	5.95	24.472	0.226	0.0	0.0	0.0	2.79	110.9	30.6
4.005	50.00	6.04	22.295	0.271	0.0	0.0	0.0	2.96	117.6	36.7
4.006	50.00	6.35	21.369	0.341	0.0	0.0	0.0	3.01	212.8	46.2
1.010	50.00	7.81	19.129	1.154	0.0	0.0	0.0	1.00	217.4	156.3
1.011	50.00	8.04	19.084	1.194	0.0	0.0	0.0	1.10	238.8	161.7
1.012	50.00	8.27	19.046	1.204	0.0	0.0	0.0	1.12	243.4	163.0
1.013	50.00	8.49	18.931	1.213	0.0	0.0	0.0	1.40	396.7	164.3
1.014	50.00	8.54	18.870	1.236	0.0	0.0	0.0	3.14	887.4	167.4
5.000	50.00	5.46	19.220	0.100	0.0	0.0	0.0	1.02	72.4	13.5

Network Design Table for GOLDTHORPE SW.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.001	20.506	0.088	233.0	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.015	16.933	0.119	142.3	0.014	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	11.578	0.033	350.8	0.025	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.017	11.812	0.033	357.9	0.011	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.018	15.998	0.046	347.8	0.010	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.019	43.309	0.123	352.1	0.103	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.000	33.907#	0.475	71.4	0.054	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	21.953#	0.277	79.3	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.020	26.702	0.066	404.6	0.058	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.021	23.960	0.140	171.1	1.232	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.022	107.229#	0.140	765.9	0.000	0.00	0.0	300.000	\/	-1	Pipe/Conduit	
1.023	14.396	0.019	757.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.024	68.428	0.081	844.8	0.000	0.00	0.0	300.000	\/	-1	Pipe/Conduit	
1.025	192.844	0.243	793.6	0.000	0.00	0.0	300.000	\/	-1	Pipe/Conduit	
1.026	5.840	0.007	834.3	0.000	0.00	0.0	300.000	\/	-1	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.001	50.00	5.80	19.098	0.116	0.0	0.0	0.0	1.03	72.5	15.7
1.015	50.00	8.68	18.710	1.366	0.0	0.0	0.0	2.04	576.7	185.0
1.016	49.72	8.81	18.441	1.391	0.0	0.0	0.0	1.49	657.5	187.3
1.017	49.33	8.94	18.408	1.402	0.0	0.0	0.0	1.47	650.9	187.3
1.018	48.83	9.12	18.375	1.412	0.0	0.0	0.0	1.49	660.4	187.3
1.019	47.53	9.61	18.329	1.515	0.0	0.0	0.0	1.49	656.3	195.0
6.000	50.00	5.36	19.483	0.054	0.0	0.0	0.0	1.55	61.6	7.3
6.001	50.00	5.61	19.008	0.096	0.0	0.0	0.0	1.47	58.5	13.0
1.020	46.71	9.93	18.206	1.669	0.0	0.0	0.0	1.39	611.9	211.1
1.021	46.25	10.11	18.140	2.901	0.0	0.0	0.0	2.14	943.8	363.4
1.022	41.93	12.14	17.750	2.901	0.0	0.0	0.0	0.88	7059.1	363.4
1.023	41.49	12.38	17.610	2.901	0.0	0.0	0.0	1.01	445.7	363.4
1.024	39.15	13.74	17.591	2.901	0.0	0.0	0.0	0.84	6721.5	363.4
1.025	34.08	17.45	17.510	2.901	0.0	0.0	0.0	0.87	6935.0	363.4
1.026	33.95	17.56	17.267	2.901	0.0	0.0	0.0	0.84	6763.7	363.4

Conduit Sections for GOLDTHORPE SW.SWS

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m^2)
-1	\/	6000	1000	26.5		3.055	8.006

Free Flowing Outfall Details for GOLDTHORPE SW.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.026	OH1	18.270	17.260	17.260	6	0

Simulation Criteria for GOLDTHORPE SW.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	1	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	15
Ratio R	0.376		

Online Controls for GOLDTHORPE SW.SWS

Orifice Manhole: VNS23, DS/PN: 1.026, Volume (m³): 1535.5

Diameter (m) 0.299 Discharge Coefficient 0.600 Invert Level (m) 17.267

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	1	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.376
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	1	+0%	100/15 Summer			
1.001	2	15 Winter	1	+0%	100/15 Summer			
2.000	24	15 Winter	1	+0%				
2.001	25	15 Winter	1	+0%	100/15 Summer			
1.002	3	15 Winter	1	+0%				
1.003	4	15 Winter	1	+0%				
1.004	5	15 Winter	1	+0%	100/15 Summer			
3.000	26	15 Winter	1	+0%	100/15 Summer			
1.005	6	15 Winter	1	+0%	100/15 Summer			
1.006	7	15 Winter	1	+0%	100/15 Summer			
1.007	8	15 Winter	1	+0%	100/15 Summer	100/15 Winter		
1.008	9	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
1.009	10	15 Winter	1	+0%	30/15 Summer			
4.000	27	15 Winter	1	+0%				
4.001	28	15 Winter	1	+0%	100/15 Winter			
4.002	29	15 Winter	1	+0%	100/15 Summer			
4.003	30	15 Winter	1	+0%	100/15 Summer			
4.004	31	15 Winter	1	+0%	100/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	31.850	-0.094	0.000	0.30			9.6	OK	
1.001	2	30.921	-0.088	0.000	0.35			13.0	OK	
2.000	24	28.740	-0.157	0.000	0.20			7.6	OK	
2.001	25	28.599	-0.146	0.000	0.27			10.1	OK	
1.002	3	28.410	-0.207	0.000	0.21			35.9	OK	
1.003	4	26.704	-0.222	0.000	0.15			43.6	OK	
1.004	5	24.440	-0.211	0.000	0.19			49.9	OK	
3.000	26	22.994	-0.185	0.000	0.07			3.6	OK	
1.005	6	22.823	-0.197	0.000	0.26			54.8	OK	
1.006	7	21.707	-0.263	0.000	0.19			62.8	OK	
1.007	8	20.853	-0.243	0.000	0.27			74.1	OK	1
1.008	9	19.537	-0.205	0.000	0.44			81.0	OK	4
1.009	10	19.512	-0.181	0.000	0.51			80.2	OK	
4.000	27	26.059	-0.108	0.000	0.17			3.3	OK	
4.001	28	25.761	-0.103	0.000	0.22			3.9	OK	
4.002	29	25.556	-0.165	0.000	0.16			14.5	OK	
4.003	30	24.850	-0.157	0.000	0.20			15.4	OK	
4.004	31	24.546	-0.151	0.000	0.24			25.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.005	32	15 Winter	1	+0%	100/15 Summer				22.377
4.006	33	15 Winter	1	+0%	100/15 Summer				21.456
1.010	11	15 Winter	1	+0%	30/15 Summer				19.490
1.011	12	15 Winter	1	+0%	30/15 Summer				19.435
1.012	13	15 Winter	1	+0%	30/15 Summer				19.384
1.013	14	15 Winter	1	+0%	100/15 Summer				19.198
1.014	15	15 Winter	1	+0%	100/15 Summer				19.096
5.000	34	15 Winter	1	+0%	100/15 Summer				19.311
5.001	34A	15 Winter	1	+0%	100/15 Summer				19.195
1.015	16	15 Winter	1	+0%	100/15 Summer				18.964
1.016	16A	15 Winter	1	+0%	100/15 Summer				18.755
1.017	16B	15 Winter	1	+0%	100/15 Summer				18.720
1.018	16C	15 Winter	1	+0%	100/15 Summer				18.665
1.019	16D	15 Winter	1	+0%	100/15 Summer				18.613
6.000	35	15 Winter	1	+0%					19.535
6.001	36	15 Winter	1	+0%	100/15 Winter				19.079
1.020	17	15 Winter	1	+0%	100/15 Summer				18.516
1.021	18	15 Winter	1	+0%	100/15 Summer				18.458
1.022	HWS19	60 Winter	1	+0%					17.962
1.023	HWS20	60 Winter	1	+0%	100/30 Summer				17.948
1.024	HWS21	60 Winter	1	+0%					17.706
1.025	VNS22	120 Winter	1	+0%					17.614
1.026	VNS23	240 Winter	1	+0%					17.536

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.005	32	-0.143	0.000	0.29			30.1	OK	
4.006	33	-0.213	0.000	0.19			37.5	OK	
1.010	11	-0.164	0.000	0.72			117.3	OK	
1.011	12	-0.174	0.000	0.77			118.6	OK	
1.012	13	-0.187	0.000	0.74			119.4	OK	
1.013	14	-0.333	0.000	0.41			119.3	OK	
1.014	15	-0.374	0.000	0.30			121.3	OK	
5.000	34	-0.209	0.000	0.19			12.7	OK	
5.001	34A	-0.203	0.000	0.23			14.5	OK	
1.015	16	-0.346	0.000	0.37			129.6	OK	
1.016	16A	-0.436	0.000	0.36			130.9	OK	
1.017	16B	-0.438	0.000	0.36			130.7	OK	
1.018	16C	-0.460	0.000	0.31			131.7	OK	
1.019	16D	-0.466	0.000	0.25			135.5	OK	
6.000	35	-0.173	0.000	0.12			6.9	OK	
6.001	36	-0.154	0.000	0.22			11.5	OK	
1.020	17	-0.440	0.000	0.31			144.7	OK	
1.021	18	-0.432	0.000	0.37			222.3	OK	
1.022	HWS19	-0.788	0.000	0.03			174.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.023	HWS20	-0.412	0.000	0.42			80.1	OK	
1.024	HWS21	-0.885	0.000	0.01			80.1	OK	
1.025	VNS22	-0.896	0.000	0.01			72.9	OK	
1.026	VNS23	-0.731	0.000	0.01			39.3	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	1	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.376
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	30	+0%	100/15 Summer			
1.001	2	15 Winter	30	+0%	100/15 Summer			
2.000	24	15 Winter	30	+0%				
2.001	25	15 Winter	30	+0%	100/15 Summer			
1.002	3	15 Winter	30	+0%				
1.003	4	15 Winter	30	+0%				
1.004	5	15 Winter	30	+0%	100/15 Summer			
3.000	26	15 Winter	30	+0%	100/15 Summer			
1.005	6	15 Winter	30	+0%	100/15 Summer			
1.006	7	15 Winter	30	+0%	100/15 Summer			
1.007	8	15 Winter	30	+0%	100/15 Summer	100/15 Winter		
1.008	9	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.009	10	15 Winter	30	+0%	30/15 Summer			
4.000	27	15 Winter	30	+0%				
4.001	28	15 Winter	30	+0%	100/15 Winter			
4.002	29	15 Winter	30	+0%	100/15 Summer			
4.003	30	15 Winter	30	+0%	100/15 Summer			
4.004	31	15 Winter	30	+0%	100/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	31.890	-0.054	0.000	0.73			23.4	OK
1.001	2	30.973	-0.036	0.000	0.92			34.0	OK
2.000	24	28.784	-0.113	0.000	0.48			18.7	OK
2.001	25	28.658	-0.087	0.000	0.68			25.8	OK
1.002	3	28.483	-0.134	0.000	0.56			96.6	OK
1.003	4	26.764	-0.162	0.000	0.42			119.8	OK
1.004	5	24.510	-0.141	0.000	0.53			138.0	OK
3.000	26	23.018	-0.161	0.000	0.18			8.9	OK
1.005	6	22.911	-0.109	0.000	0.71			151.4	OK
1.006	7	21.796	-0.174	0.000	0.54			175.2	OK
1.007	8	20.972	-0.124	0.000	0.76			212.0	OK
1.008	9	20.211	0.469	0.000	1.17			216.3	SURCHARGED
1.009	10	20.142	0.449	0.000	1.41			222.6	SURCHARGED
4.000	27	26.086	-0.081	0.000	0.42			8.1	OK
4.001	28	25.794	-0.070	0.000	0.54			9.7	OK
4.002	29	25.605	-0.116	0.000	0.47			42.8	OK
4.003	30	24.906	-0.101	0.000	0.58			45.4	OK
4.004	31	24.613	-0.084	0.000	0.71			75.0	OK

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
2.000	24	
2.001	25	
1.002	3	
1.003	4	
1.004	5	
3.000	26	
1.005	6	
1.006	7	
1.007	8	1
1.008	9	4
1.009	10	
4.000	27	
4.001	28	
4.002	29	
4.003	30	
4.004	31	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.005	32	15 Winter	30	+0%	100/15 Summer				22.457
4.006	33	15 Winter	30	+0%	100/15 Summer				21.531
1.010	11	15 Winter	30	+0%	30/15 Summer				20.079
1.011	12	15 Winter	30	+0%	30/15 Summer				19.914
1.012	13	15 Winter	30	+0%	30/15 Summer				19.725
1.013	14	15 Summer	30	+0%	100/15 Summer				19.531
1.014	15	15 Winter	30	+0%	100/15 Summer				19.325
5.000	34	15 Winter	30	+0%	100/15 Summer				19.368
5.001	34A	15 Winter	30	+0%	100/15 Summer				19.288
1.015	16	15 Winter	30	+0%	100/15 Summer				19.265
1.016	16A	15 Winter	30	+0%	100/15 Summer				19.031
1.017	16B	15 Winter	30	+0%	100/15 Summer				18.994
1.018	16C	15 Winter	30	+0%	100/15 Summer				18.915
1.019	16D	15 Winter	30	+0%	100/15 Summer				18.866
6.000	35	15 Winter	30	+0%					19.567
6.001	36	15 Winter	30	+0%	100/15 Winter				19.132
1.020	17	15 Winter	30	+0%	100/15 Summer				18.781
1.021	18	15 Winter	30	+0%	100/15 Summer				18.719
1.022	HWS19	60 Winter	30	+0%					18.233
1.023	HWS20	60 Winter	30	+0%	100/30 Summer				18.204
1.024	HWS21	60 Winter	30	+0%					17.780
1.025	VNS22	180 Winter	30	+0%					17.718
1.026	VNS23	180 Winter	30	+0%					17.703

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.005	32	-0.063	0.000	0.86			89.8	OK	
4.006	33	-0.138	0.000	0.55			111.8	OK	
1.010	11	0.425	0.000	2.00			328.4	SURCHARGED	
1.011	12	0.305	0.000	2.17			333.6	SURCHARGED	
1.012	13	0.154	0.000	2.06			333.0	SURCHARGED	
1.013	14	0.000	0.000	1.09			319.8	OK	
1.014	15	-0.145	0.000	0.83			333.4	OK	
5.000	34	-0.152	0.000	0.47			31.0	OK	
5.001	34A	-0.110	0.000	0.57			36.1	OK	
1.015	16	-0.045	0.000	1.00			347.1	OK	
1.016	16A	-0.160	0.000	0.95			349.6	OK	
1.017	16B	-0.164	0.000	0.97			350.6	OK	
1.018	16C	-0.210	0.000	0.83			352.0	OK	
1.019	16D	-0.213	0.000	0.66			360.1	OK	
6.000	35	-0.141	0.000	0.29			16.9	OK	
6.001	36	-0.101	0.000	0.57			30.6	OK	
1.020	17	-0.175	0.000	0.83			382.2	OK	
1.021	18	-0.171	0.000	0.93			566.2	OK	
1.022	HWS19	-0.517	0.000	0.06			425.7	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.023	HWS20	-0.156	0.000	1.20			229.5	OK	
1.024	HWS21	-0.811	0.000	0.04			228.3	OK	
1.025	VNS22	-0.792	0.000	0.02			164.0	OK	
1.026	VNS23	-0.564	0.000	0.01			88.6	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	1	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.376
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+30%	100/15 Summer			
1.001	2	15 Winter	100	+30%	100/15 Summer			
2.000	24	15 Winter	100	+30%				
2.001	25	15 Winter	100	+30%	100/15 Summer			
1.002	3	15 Winter	100	+30%				
1.003	4	15 Winter	100	+30%				
1.004	5	15 Winter	100	+30%	100/15 Summer			
3.000	26	15 Winter	100	+30%	100/15 Summer			
1.005	6	15 Winter	100	+30%	100/15 Summer			
1.006	7	15 Winter	100	+30%	100/15 Summer			
1.007	8	15 Winter	100	+30%	100/15 Summer	100/15 Winter		
1.008	9	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
1.009	10	15 Winter	100	+30%	30/15 Summer			
4.000	27	15 Winter	100	+30%				
4.001	28	15 Winter	100	+30%	100/15 Winter			
4.002	29	15 Winter	100	+30%	100/15 Summer			
4.003	30	15 Winter	100	+30%	100/15 Summer			
4.004	31	15 Winter	100	+30%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	32.705	0.761	0.000	1.08			35.0	SURCHARGED
1.001	2	31.579	0.570	0.000	1.32			48.8	SURCHARGED
2.000	24	28.871	-0.026	0.000	0.80			31.2	OK
2.001	25	28.768	0.023	0.000	1.11			42.3	SURCHARGED
1.002	3	28.541	-0.076	0.000	0.88			150.5	OK
1.003	4	26.808	-0.118	0.000	0.66			188.5	OK
1.004	5	24.921	0.270	0.000	0.84			216.8	SURCHARGED
3.000	26	23.975	0.796	0.000	0.40			20.4	SURCHARGED
1.005	6	23.951	0.931	0.000	1.00			212.5	SURCHARGED
1.006	7	22.936	0.966	0.000	0.75			240.7	SURCHARGED
1.007	8	22.410	1.314	0.454	1.00			277.5	FLOOD
1.008	9	21.068	1.326	12.329	1.75			324.2	FLOOD
1.009	10	20.998	1.305	0.000	2.15			339.8	FLOOD RISK
4.000	27	26.112	-0.055	0.000	0.71			13.7	OK
4.001	28	25.882	0.018	0.000	0.91			16.3	SURCHARGED
4.002	29	25.789	0.068	0.000	0.74			68.2	SURCHARGED
4.003	30	25.480	0.473	0.000	0.84			65.7	SURCHARGED
4.004	31	25.287	0.590	0.000	1.00			106.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	
1.001	2	
2.000	24	
2.001	25	
1.002	3	
1.003	4	
1.004	5	
3.000	26	
1.005	6	
1.006	7	
1.007	8	1
1.008	9	4
1.009	10	
4.000	27	
4.001	28	
4.002	29	
4.003	30	
4.004	31	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.005	32	15 Winter	100	+30%	100/15 Summer				23.173
4.006	33	15 Winter	100	+30%	100/15 Summer				22.025
1.010	11	15 Winter	100	+30%	30/15 Summer				20.936
1.011	12	15 Winter	100	+30%	30/15 Summer				20.684
1.012	13	15 Winter	100	+30%	30/15 Summer				20.393
1.013	14	15 Winter	100	+30%	100/15 Summer				20.089
1.014	15	15 Winter	100	+30%	100/15 Summer				19.907
5.000	34	15 Winter	100	+30%	100/15 Summer				19.871
5.001	34A	15 Winter	100	+30%	100/15 Summer				19.799
1.015	16	15 Winter	100	+30%	100/15 Summer				19.720
1.016	16A	15 Winter	100	+30%	100/15 Summer				19.493
1.017	16B	15 Winter	100	+30%	100/15 Summer				19.445
1.018	16C	15 Winter	100	+30%	100/15 Summer				19.395
1.019	16D	15 Winter	100	+30%	100/15 Summer				19.339
6.000	35	15 Winter	100	+30%					19.596
6.001	36	15 Winter	100	+30%	100/15 Winter				19.326
1.020	17	15 Winter	100	+30%	100/15 Summer				19.229
1.021	18	15 Winter	100	+30%	100/15 Summer				19.139
1.022	HWS19	60 Winter	100	+30%					18.428
1.023	HWS20	60 Winter	100	+30%	100/30 Summer				18.385
1.024	HWS21	180 Winter	100	+30%					17.966
1.025	VNS22	180 Winter	100	+30%					17.946
1.026	VNS23	180 Winter	100	+30%					17.919

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.005	32	0.653	0.000	1.20			125.9	SURCHARGED	
4.006	33	0.356	0.000	0.79			158.8	SURCHARGED	
1.010	11	1.282	0.000	2.53			415.4	FLOOD RISK	
1.011	12	1.075	0.000	2.78			428.4	SURCHARGED	
1.012	13	0.822	0.000	2.64			426.8	SURCHARGED	
1.013	14	0.558	0.000	1.46			427.6	SURCHARGED	
1.014	15	0.437	0.000	1.08			434.7	SURCHARGED	
5.000	34	0.351	0.000	0.76			50.1	SURCHARGED	
5.001	34A	0.401	0.000	0.77			48.8	SURCHARGED	
1.015	16	0.410	0.000	1.39			481.6	SURCHARGED	
1.016	16A	0.302	0.000	1.33			488.2	SURCHARGED	
1.017	16B	0.287	0.000	1.35			490.6	SURCHARGED	
1.018	16C	0.270	0.000	1.17			493.2	SURCHARGED	
1.019	16D	0.260	0.000	0.95			514.7	SURCHARGED	
6.000	35	-0.112	0.000	0.49			28.4	OK	
6.001	36	0.093	0.000	0.91			48.7	SURCHARGED	
1.020	17	0.273	0.000	1.20			555.5	SURCHARGED	
1.021	18	0.249	0.000	1.60			969.0	SURCHARGED	
1.022	HWS19	-0.322	0.000	0.11			723.8	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for GOLDTHORPE SW.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.023	HWS20	0.025	0.000	3.12			596.1	SURCHARGED	
1.024	HWS21	-0.625	0.000	0.05			294.8	OK	
1.025	VNS22	-0.564	0.000	0.04			250.8	OK	
1.026	VNS23	-0.348	0.000	0.02			122.5	OK	

End of Report