## Summary of Results for 100 year Return Period (+40%)

| Storm Event | Max Level (m) | Max Depth (m) | Max Control (l/s) | Max Volume (m³) | Status |
|---|---|---|---|---|---|
| 60 min Winter | 98.833 | 0.833 | 45.1 | 903.2 | O K |
| 120 min Winter | 98.943 | 0.943 | 45.1 | 1022.7 | O K |
| 180 min Winter | 98.984 | 0.984 | 45.1 | 1066.9 | O K |
| 240 min Winter | 98.996 | 0.996 | 45.1 | 1079.4 | O K |
| 360 min Winter | 99.000 | 1.000 | 45.2 | 1083.5 | O K |
| 480 min Winter | 98.983 | 0.983 | 45.1 | 1065.3 | O K |
| 600 min Winter | 98.954 | 0.954 | 45.1 | 1033.9 | O K |
| 720 min Winter | 98.918 | 0.918 | 45.1 | 995.2 | O K |
| 960 min Winter | 98.830 | 0.830 | 45.1 | 899.8 | O K |
| 1440 min Winter | 98.621 | 0.621 | 45.1 | 673.3 | O K |
| 2160 min Winter | 98.392 | 0.392 | 45.0 | 425.2 | O K |
| 2880 min Winter | 98.276 | 0.276 | 43.4 | 299.5 | O K |
| 4320 min Winter | 98.219 | 0.219 | 33.1 | 237.2 | O K |
| 5760 min Winter | 98.190 | 0.190 | 26.9 | 206.5 | O K |
| 7200 min Winter | 98.172 | 0.172 | 22.8 | 186.4 | O K |
| 8640 min Winter | 98.159 | 0.159 | 20.0 | 171.9 | O K |
| 10080 min Winter | 98.148 | 0.148 | 17.8 | 160.9 | O K |

| Storm Event | Rain (mm/hr) | Flooded Volume (m³) | Discharge Volume (m³) | Time-Peak (mins) |
|---|---|---|---|---|
| 60 min Winter | 61.875 | 0.0 | 1000.7 | 62 |
| 120 min Winter | 37.983 | 0.0 | 1230.0 | 118 |
| 180 min Winter | 28.551 | 0.0 | 1387.6 | 172 |
| 240 min Winter | 23.316 | 0.0 | 1511.4 | 222 |
| 360 min Winter | 17.526 | 0.0 | 1704.9 | 278 |
| 480 min Winter | 14.313 | 0.0 | 1856.8 | 356 |
| 600 min Winter | 12.232 | 0.0 | 1983.8 | 434 |
| 720 min Winter | 10.759 | 0.0 | 2094.0 | 508 |
| 960 min Winter | 8.754 | 0.0 | 2271.7 | 656 |
| 1440 min Winter | 6.545 | 0.0 | 2547.3 | 922 |
| 2160 min Winter | 4.894 | 0.0 | 2865.9 | 1256 |
| 2880 min Winter | 3.982 | 0.0 | 3108.3 | 1532 |
| 4320 min Winter | 2.943 | 0.0 | 3441.2 | 2244 |
| 5760 min Winter | 2.374 | 0.0 | 3711.0 | 2944 |
| 7200 min Winter | 2.010 | 0.0 | 3926.7 | 3680 |
| 8640 min Winter | 1.755 | 0.0 | 4111.3 | 4408 |
| 10080 min Winter | 1.564 | 0.0 | 4271.4 | 5144 |

## Rainfall Details

| | |
|---|---|
| Rainfall Model | FEH |
| Return Period (years) | 100 |
| FEH Rainfall Version | 1999 |
| Site Location | 406450 374300 SK 06450 74300 |
| C (1km) | -0.025 |
| D1 (1km) | 0.411 |
| D2 (1km) | 0.398 |
| D3 (1km) | 0.369 |
| E (1km) | 0.301 |
| F (1km) | 2.404 |
| Summer Storms | Yes |
| Winter Storms | Yes |
| Cv (Summer) | 0.750 |
| Cv (Winter) | 0.840 |
| Shortest Storm (mins) | 15 |
| Longest Storm (mins) | 10080 |
| Climate Change % | +40 |

## Time Area Diagram

Total Area (ha) 1.940

| Time From: | (mins) To: | Area (ha) |
|---|---|---|
| 0 | 4 | 1.940 |

## Model Details

Storage is Online Cover Level (m) 100.000

## Tank or Pond Structure

Invert Level (m) 98.000

| Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 1084.0 | 1.000 | 1084.0 | 1.001 | 0.0 |

## Hydro-Brake® Optimum Outflow Control

| | |
|---|---|
| Unit Reference | MD-SHE-0282-4520-1000-4520 |
| Design Head (m) | 1.000 |
| Design Flow (l/s) | 45.2 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 282 |
| Invert Level (m) | 98.000 |
| Minimum Outlet Pipe Diameter (mm) | 300 |
| Suggested Manhole Diameter (mm) | 1800 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 1.000 | 45.2 |
| Flush-Flo™ | 0.432 | 45.1 |
| Kick-Flo® | 0.774 | 40.0 |
| Mean Flow over Head Range | - | 36.4 |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 8.8 | 1.200 | 49.3 | 3.000 | 76.8 | 7.000 | 116.1 |
| 0.200 | 29.0 | 1.400 | 53.1 | 3.500 | 82.8 | 7.500 | 120.1 |
| 0.300 | 43.9 | 1.600 | 56.7 | 4.000 | 88.4 | 8.000 | 124.0 |
| 0.400 | 45.0 | 1.800 | 60.0 | 4.500 | 93.6 | 8.500 | 127.7 |
| 0.500 | 44.8 | 2.000 | 63.1 | 5.000 | 98.5 | 9.000 | 131.3 |
| 0.600 | 44.0 | 2.200 | 66.1 | 5.500 | 103.2 | 9.500 | 134.8 |
| 0.800 | 40.6 | 2.400 | 69.0 | 6.000 | 107.7 | | |
| 1.000 | 45.2 | 2.600 | 71.7 | 6.500 | 112.0 | | |

# Appendix L

## Overland Flows

## JPP Consulting drawing no. 11024-FRA06B

## General notes

All dimensions are in metres unless otherwise stated.

All levels are in metres.

This drawing is to be read in conjunction with all relevant Engineers and Architect's drawings, Specifications, Reports and Engineering Details.

Do not scale from this drawing.

Based on Topographical Land Survey by SurveyEng Ltd, drawing number BH.TS.12 Rev C dated 26.03.2021.

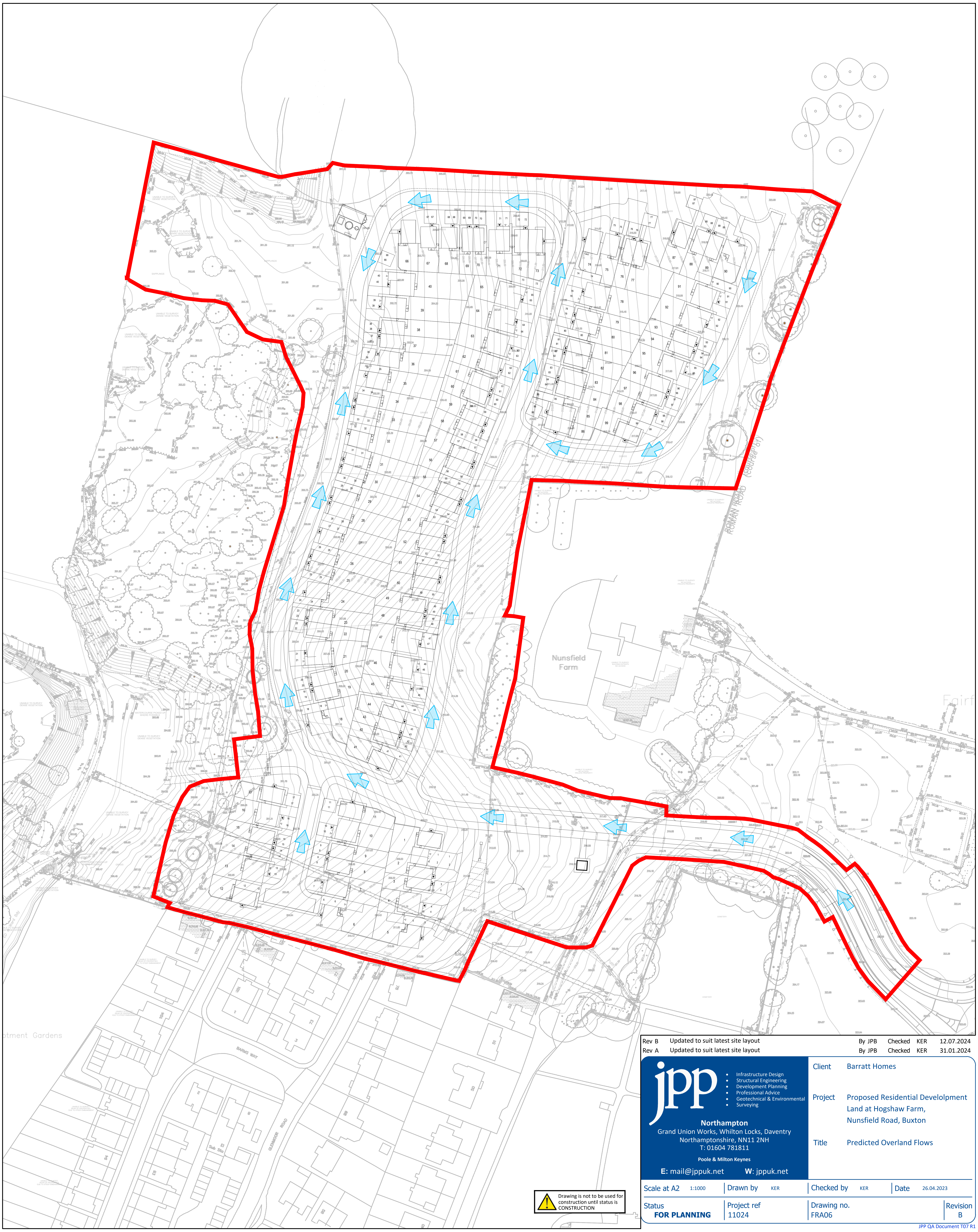
Based on Planning Layout by Barratt Homes, drawing number H8797-BAH-XX-XX-DR-UD-203001-P03 dated 28.06.2024.

Based on Drainage Layout by Barratt Homes, drawing number H8797-BAH-XX-XX-DR-CE-300001-P07 dated 01.07.2024.

## Drawing Key

Predicted Overland Flows

Site Boundary




| | | | | | |
|---|---|---|---|---|---|
| Rev B | Updated to suit latest site layout | By JPB | Checked | KER | 12.07.2024 |
| Rev A | Updated to suit latest site layout | By JPB | Checked | KER | 31.01.2024 |

jpp

- Infrastructure Design
- Structural Engineering
- Development Planning
- Professional Advice
- Geotechnical & Environmental
- Surveying


**Northampton**
Grand Union Works, Whilton Locks, Daventry
Northamptonshire, NN11 2NH
T: 01604 781811

Poole & Milton Keynes

E: mail@jppuk.net W: jppuk.net


Client: Barratt Homes

Project: Proposed Residential Development Land at Hogshaw Farm, Nunsfield Road, Buxton

Title: Predicted Overland Flows

Drawing is not to be used for construction until status is CONSTRUCTION

| Scale at A2 | Drawn by | Checked by | Date |
|---|---|---|---|
| 1:1000 | KER | KER | 26.04.2023 |

| Status | Project ref | Drawing no. | Revision |
|---|---|---|---|
| FOR PLANNING | 11024 | FRA06 | B |

# Appendix M

## Severn Trent Water Pre-Development Enquiry

WONDERFUL ON TAP

SEVERN TRENT

**Severn Trent Water Ltd**
Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

Contact: Emma Nowak
Mob: 07970361864

Email:
Network.Solutions@SevernTrent.co.uk

Our ref: 1080322

JPP Consulting Ltd,
4 Ironstone Way,
Brixworth,
Northampton,
NN6 9UD.

FAO: Katherine Rose

20th April 2023

Dear Katherine,

**Proposed Residential Development (116 Residential Dwellings) at: Land at Hogshaw Farm, Nunsfield Road, Buxton**

**X: 406585 / Y: 374410**

I refer to your Development Enquiry Request submitted in respect of the above site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) referred to below.

**Public Sewers in Site – Required Protection**

There are no public sewers crossing the site.

*Please Note: On 1st October 2011 many private sewers were transferred into the ownership of Severn Trent Water as public sewers, where two or more properties in separate ownership are served by those sewers. Most of these former private sewers will not be shown on the public sewer records, therefore a full site survey should be carried out prior to any layout design or construction works to identify where these sewers may be and to avoid later delays and possible added costs.*

**Foul Water Drainage**

The most convenient point of connection for gravity foul flows from the site is at the 150mm public foul sewer southwest of the site at the junction of Barms Way & Nunsfield Road. A gravity connection for an additional 116 dwellings (1.8 l/s 2DWF) would be acceptable at this sewer at a new or existing manhole (5203) subject to formal 106 approval.

Please note that a gravity connection should be viable for the whole site, however should after investigations, a pumped connection be required for any part of the site, please notify us as soon as possible further modelling may be required to understand the impact of increased flows in the foul network.

**Surface Water Drainage**

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If this is not practical a connection to the watercourse southeast of the site would be acceptable subject to LLFA approval. In addition, other sustainable drainage methods should also be explored before a discharge to the public sewerage system is considered.

If these are found to be unsuitable, satisfactory evidence will need to be submitted. The evidence should be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter).

The site drainage should be discussed with the Local Lead Flood Authority with a view to implement suitable SuDS techniques to land soakaways or other land drainage systems prior to any consideration of discharges to public sewers being accepted. Any discharge rate to a watercourse or drainage ditch will be determined by the LLFA.

Should soakaways / SuDs prove not to be viable, the Nun Brook runs west of the proposed development. A connection to the watercourse should be pursued but may require the crossing of third-party land. Please note, that if you cannot gain consent from the landowner, a S98 Sewer Requisition may be required. For your information, STW have the right to lay sewers through 3rd party land even unregistered land, however, STW do not have the right to discharge to a watercourse/ditch. In order to discharge to a watercourse we require a Deed Of Grant Of Easement (DOGOE) from the watercourse owner. Please liaise with the LLFA as statutory consultee in the planning process to agree flow rates at this location.

No impact on the public network.

WONDERFUL ON TAP

SEVERN TRENT

**New Connections**

For any new connections including the use, reuse and indirect to the public sewerage system, the developer will need to submit Section 106 application. Our Developer Services department are responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes, please call 0800 707 6600, email new.connections@severntrent.co.uk or download from www.stwater.co.uk

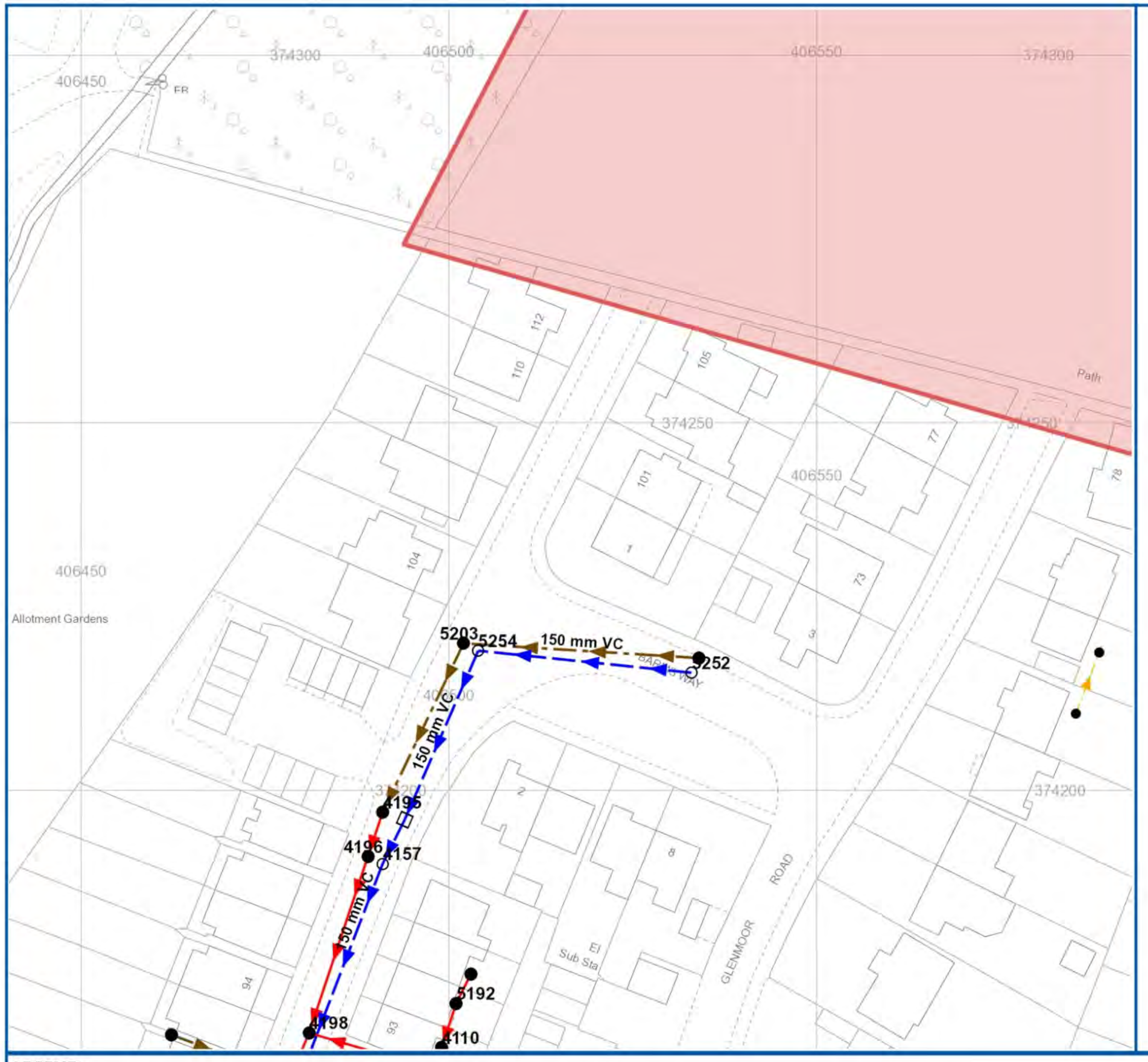
Please quote the above reference number in any future correspondence (including e-mails) with STW Limited. Please send **all correspondence** to the network.solutions@severntrent.co.uk email inbox address, a response will be made within 15 days.

If you require a VAT receipt for the application fee please email MISCINCOME.NC@SEVERNTRENT.CO.UK quoting the above Reference Number.

Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely,

Emma Nowak.
**Senior Evaluation Technician**
**Network Solutions**
**Developer Services**




| Reference | Cover Level | Invert Level Upstream | Invert Level Downstream | Purpose | Material | Pipe Shape | Max Size | Min Size | Gradient | Year Laid |
|---|---|---|---|---|---|---|---|---|---|---|
| SK06745203 | 306.1759 | 304.78 | 303.4 | F | VC | C | 150 | <UNK> | 18.48 | 31/12/1899 00:00:00 |
| SK06745254 | 306.242 | 304.93 | 303.91 | S | VC | C | 150 | <UNK> | 24.59 | 31/12/1899 00:00:00 |
| SK06744196 | 304.957 | <UNK> | 300.86 | C | VC | C | <UNK> | <UNK> | 0 | 31/12/1899 00:00:00 |
| SK06745201 | 309.9079 | 308.58 | 304.79 | F | VC | C | 150 | <UNK> | 8.46 | 31/12/1899 00:00:00 |
| SK06744195 | 305.1549 | 303.4 | <UNK> | C | VC | C | 150 | <UNK> | 0 | 31/12/1899 00:00:00 |
| SK06745191 | 306.591 | 305.981 | 305.746 | C | VC | C | 100 | <UNK> | 18.63 | 31/12/1899 00:00:00 |
| SK06744110 | 306.3659 | 305.206 | <UNK> | C | VC | C | 100 | <UNK> | 0 | 31/12/1899 00:00:00 |
| SK06745252 | 309.9419 | 308.572 | 304.94 | S | VC | C | 150 | <UNK> | 8.03 | 31/12/1899 00:00:00 |
| SK06745192 | 306.436 | 305.726 | 305.226 | C | VC | C | 100 | <UNK> | 12.64 | 31/12/1899 00:00:00 |
| SK06744198 | 304.035 | 300.84 | 299.375 | C | VC | C | 225 | <UNK> | 33.86 | 31/12/1899 00:00:00 |
| SK06744157 | 304.967 | 303.537 | <UNK> | S | VC | C | 150 | <UNK> | 0 | 31/12/1899 00:00:00 |
| <UNK> | <UNK> | <UNK> | <UNK> | F | VC | <UNK> | <UNK> | <UNK> | <UNK> | 05/07/2020 00:00:00 |
| <UNK> | <UNK> | <UNK> | <UNK> | F | VC | <UNK> | <UNK> | <UNK> | <UNK> | 14/04/2021 00:00:00 |

## LEGEND

Ancillary: Balancing Lagoon, Grease Trap, Interceptor, Screen

Chamber: Flushing Chamber, Soakaway, Overflow

Connector: Sewer Junctions, SewerLine Connection Node

Fitting: Blind Shaft, Facility Connector, Head Node, Lamphole, Sewerage Air Valve, Sewerage Chemical Injection Point, Sewerage Hatch Box, Sewerage Pressure Washout, Vent Column, Waste Water Outfall

Control Valve: Hydrobrake, Penstock, Sewerage Isolation Valve, Sewerage Non Return Valve

Manhole: Foul Bifurcation Manhole, Combined Bifurcation Manhole, Surface Water Bifurcation Manhole, Dual Manhole, Foul Single Manhole, Combined Single Manhole, Surface Water Single Manhole, Twin Manhole, Foul Adopted Manhole, Combined Adopted Manhole, Surface Adopted Manhole, Transferred Manhole, Unsurveyed Manhole

Operational Site

Waste Water Pump: Transferred Asset, S24

S104, S102, Null Private, Null, None, Highway Drain, Adopted Sewer

Storage: Disposal Site, Off-Line Waste Water Storage, On-Line Waste Water Storage, Wet Well

Waste Water Process Structure: Sewage Treatment Point, Sewage Treatment Structure, Sludge Treatment Point, Sludge Treatment Structure

Gravity Sewer Pipe: Foul Gravity Sewer, Combined Gravity Sewer, Surface Water Gravity Sewer, S104 Surface Water Gravity Sewer, S104 Combined Gravity Sewer, S104 Foul Gravity Sewer, Private Surface Water Gravity Sewer, Private Combined Gravity Sewer, Private Foul Gravity Sewer, Surface Water Unsurveyed Pipe, Combined Unsurveyed Pipe, Foul Unsurveyed Pipe, Transfered Surface Water Sewer, Transfered Combined Sewer, Transfered Foul Sewer, Disposal Pipe, Overflow Pipe, Culverted Water Course, Waste Internal Site Pipe, Sewer Service Connection, Gravity Sewer Others

Pressure Sewer Pipe: Surface Water Pressure Sewer, Combined Pressure Sewer, Foul Pressure Sewer, S104 Surface Water Pressure Sewer, S104 Combined Pressure Sewer, S104 Foul Pressure Sewer, Private Surface Water Pressure Sewer, Private Combined Pressure Sewer, Private Foul Pressure Sewer, Surface Water Vacuum Sewer, Foul Vacuum Sewer, Combined Vacuum Sewer, S104 Surface Water Vacuum Sewer, S104 Combined Vacuum Sewer, S104 Foul Vacuum Sewer, Private Surface Water Vaccum Sewer, Private Combined Vacuum Sewer, Private Foul Vacuum Sewer, Surface Water Siphon, Combined Siphon, Foul Siphon, Private Surface Water Siphon, Private Combined Siphon, Private Foul Siphon, S104 Surface Water Siphon, S104 Combined Siphon, S104 Foul Siphon, Surface Water Unsurveyed Pipe, Combined Unsurveyed Pipe, Foul Unsurveyed Pipe, Disposal Pipe

Service Pipe: Surface Water Lateral Drain, Combined Lateral Drain, Foul Lateral Drain, S104 Surface Water Lateral Drain, S104 Combined Lateral Drain, S104 Foul Lateral Drain, Private Surface Water Lateral Drain, Private Combined Lateral Drain, Private Foul Lateral Drain, Transferred Surface Water Lateral Dra, Transferred Combined Lateral Drain, Transferred Foul Lateral Drain

LandlineSymbol: Culvert Symbol, Direction Of Flow Symbol, Boundary Half Mereing Symbol, Bench Mark Symbol, Railway Switch Symbol, Road Related Flow Symbol

Print50mLine

**MATERIALS**

- \- NONE
- AC - ASBESTOS CEME
- BR - BRICK
- CC - CONCRETE BOX CULVERT
- CI - CAST IRON
- CO - CONCRETE
- CSB - CONCRETE SEGMENTS (BOLTED)
- CSU - CONCRETE SEGMENTS (UNBOLTED)
- DI - DUCTILE IRON
- GRP - GLASS REINFORCED PLASTIC
- MAC - MASONRY IN REGULAR COURSES
- MAR - MASONRY RANDOMLY COURSED
- PE - POLYETHLENE
- PF - PITCH
- PP - POLYPROPYLENE
- PSC - PLASTIC STEEL COMPOSITE
- PVC - POLYVINYL CHLORIDE
- RPM - REINFORCED PLASTIC MATRIX
- SI - SPUN (GREY) IRON
- ST - STEEL
- U - UNKNOWN
- VC - VITRIFIED CLAY
- XXX - OTHER

**CATEGORIES**

- W - WEIR
- C - CASCADE
- DB - DAMBOARD
- SE - SIDE ENTRY
- FV - FLAP VALVE
- BD - BACK DROP
- S - SIPHON
- D - HIGHWAY DRAIN
- S104 - SECTION 104

**SHAPE**

- C - CIRCULAR
- E - EGG SHAPED
- O - OTHER
- R - RECTANGLE
- S - SQUARE
- T - TRAPEZOIDAL
- U - UNKNOWN

**PURPOSE**

- C - COMBINED
- E - FINAL EFFLUENT
- F - FOUL
- L - SLUDGE
- S - SURFACE WATER

N W E S


SEVERN TRENT

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616


# SEWER RECORD (Tabular)

**O/S Map Scale:** 1:750

**This map is centred upon:**

**Date of Issue:** 20-04-23

**X:** 406516.49 **Y:** 374235.53

**Disclaimer Statement:**

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.



5 Ordnance Survey licence number: **100031673**

# Appendix N

## Hydraulic Modelling Report

## JBA Technical Note 2023s1142

# TECHNICAL NOTE

| | |
|---|---|
| JBA Project Code | 2023s1142 |
| Contract | Hydraulic Modelling at Hogshaw Farm |
| Client | Barratt Homes Manchester |
| Date | January 2024 |
| Author | Ella Albrighton BSc |
| Reviewer / Sign-off | Amy Evans BSc MCIWEM C.WEM |
| Subject | Hydraulic Modelling at Hogshaw Farm, Buxton |

## 1 Introduction

### 1.1 Terms of reference

JBA Consulting were commissioned by JPP Consulting Ltd on behalf of Barratt Homes Manchester to undertake a fluvial hydraulic modelling study in order to support their planning application for a proposed development at their site at Hogshaw Farm, Buxton.

The Nun Brook, which becomes an Environment Agency Main River downstream of the site, flows in a southerly direction through the north-western part of the site. The watercourse is culverted during this reach.  The culvert has a diameter of 1.22m.  The location of the site and the Nun Brook are included within Figure 1-1 below.

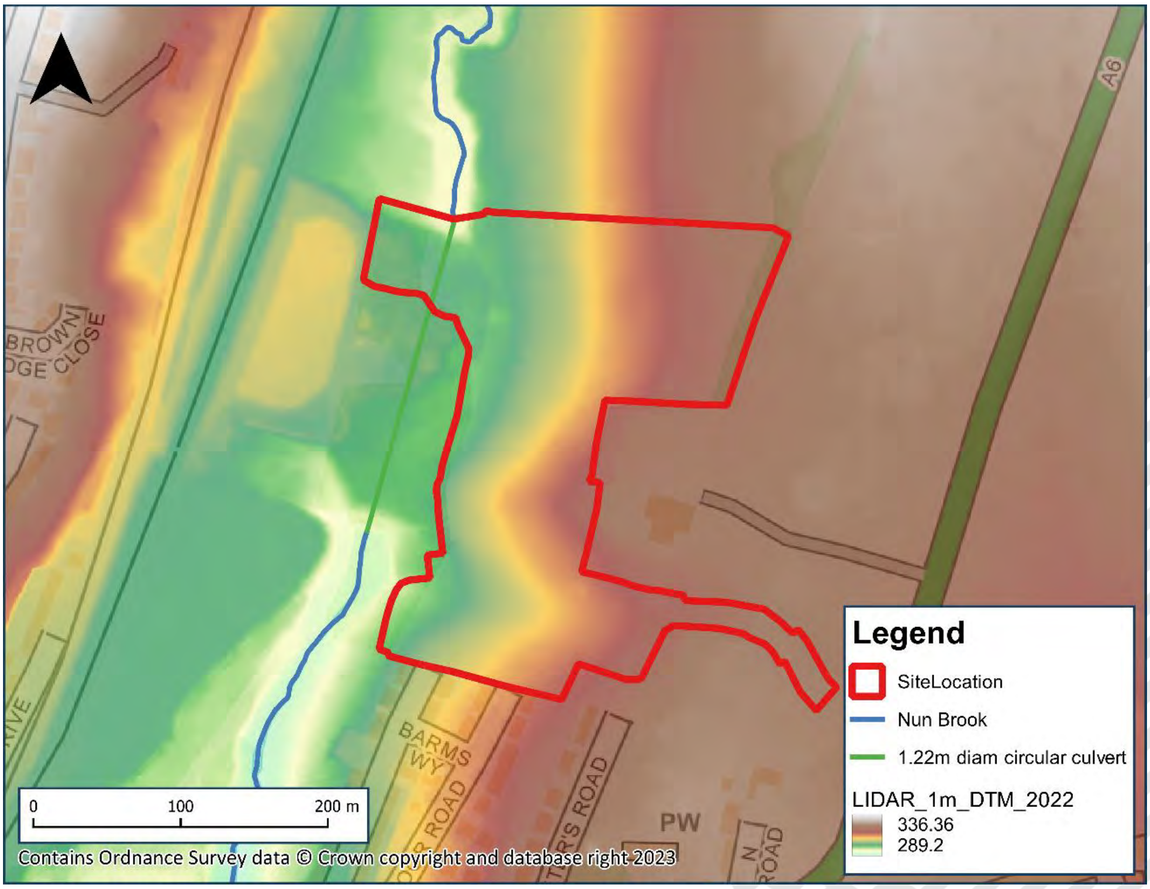



Figure 1-1 - Site Location

# 2 Baseline Hydraulic modelling

## 2.1 Modelling Approach

A license to re-use the 1D-2D ESTRY-TUFLOW 2022 Hogshaw and Nun Brook hydraulic model was obtained from the Environment Agency for use in this study. The hydrology inflows, calculated in 2022 as part of the original modelling, were retained as these still reflect best practises.

The extent of the existing model in relation to the site is shown within Figure 2-1 below.

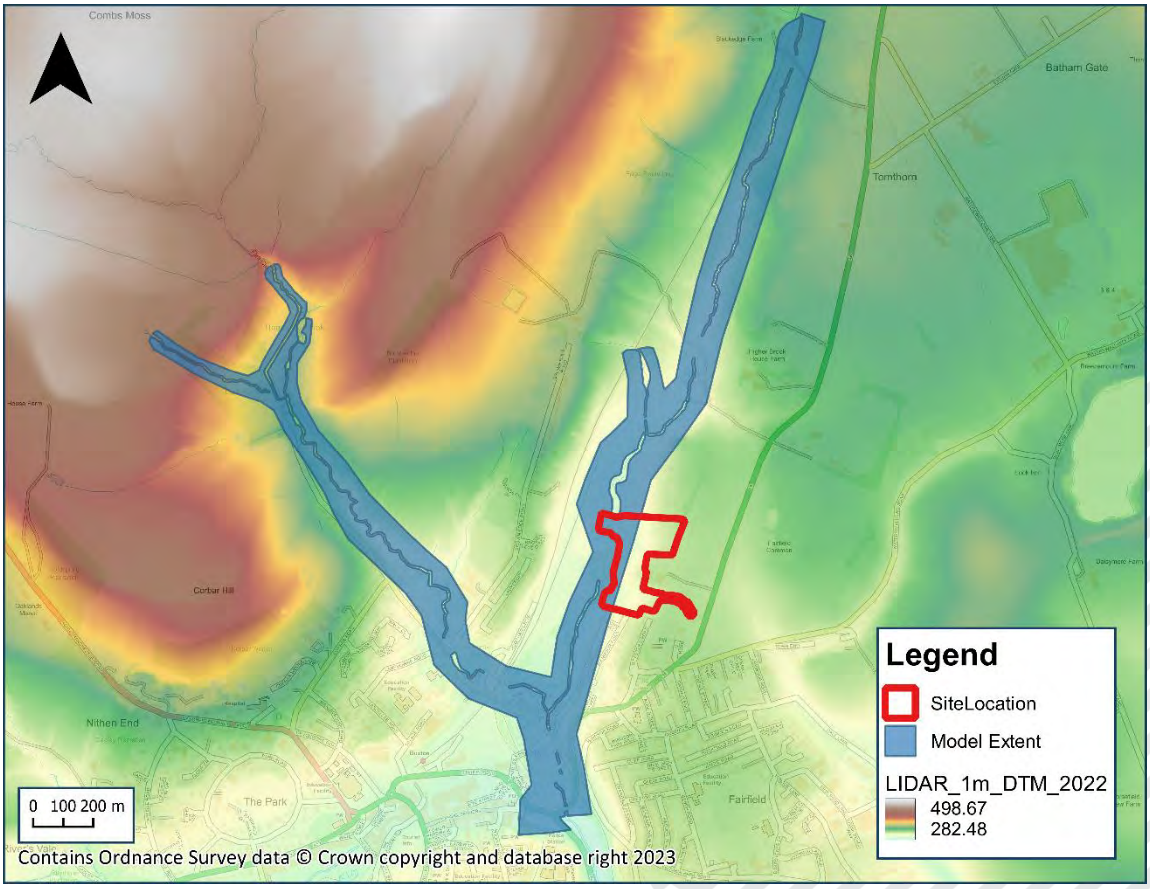



Figure 2-1: Existing model extent

New topographic survey data (included within Appendix A) representing the current ground levels within the site was integrated within the model.

The updated and refined baseline model was run with TUFLOW version 2023-03-AA-iDP-w64 for the 30-year, 100-year, 100-year with climate change (29%) and 1000-year fluvial flood events.

## 2.2 Baseline model results

### 2.2.1 Baseline flood extents

The baseline flood extents during the 30-year, 100-year and 1000-year events are shown in Figure 2-2 below. Figure 2-3 shows the impact of climate change on the 100-year flood extents.

This shows that only the north-western area of the site is included with the maximum flood extent during all of the modelled flood extents.

Figure 2-3 shows that, when 29% climate change is applied to the 100-year event, there is no impact on flood extents within the site.  Upstream of the site, there is a slight increase in flood extent.

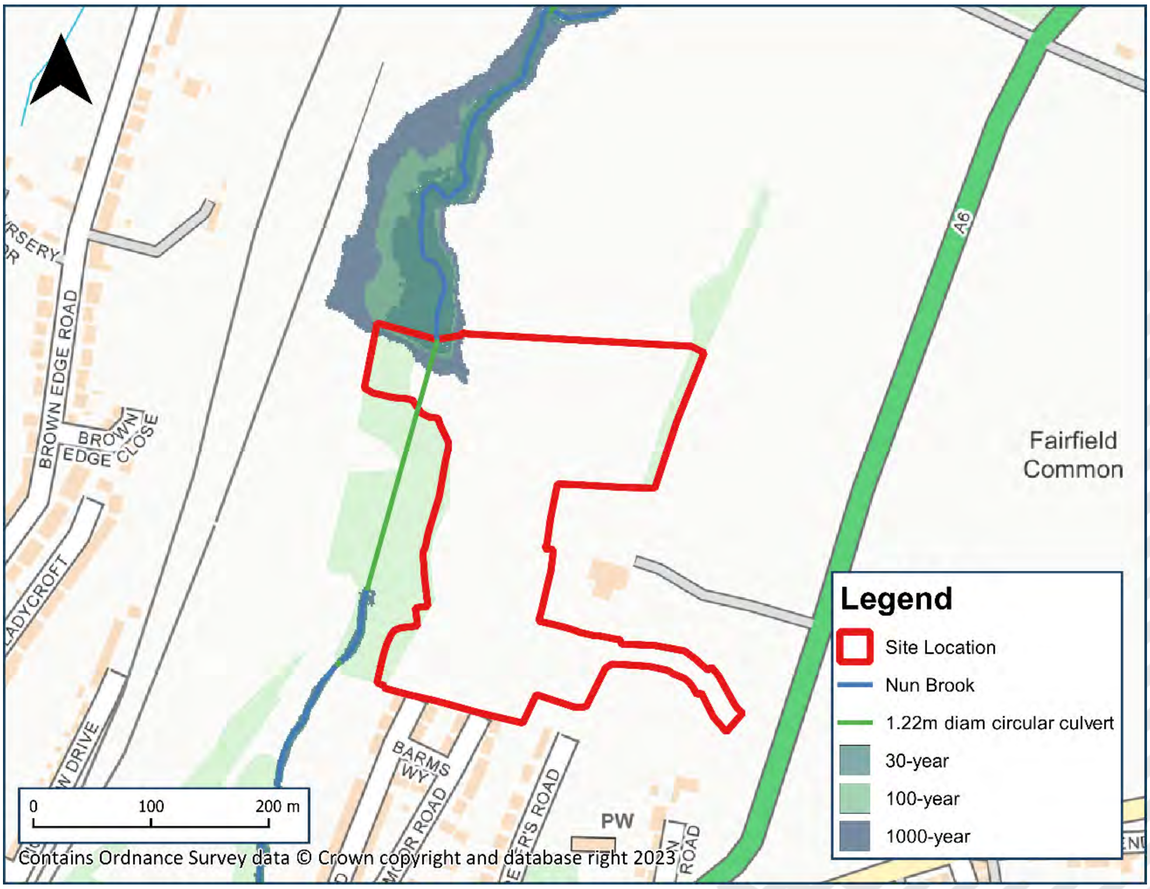



Figure 2-2: Baseline flood extents

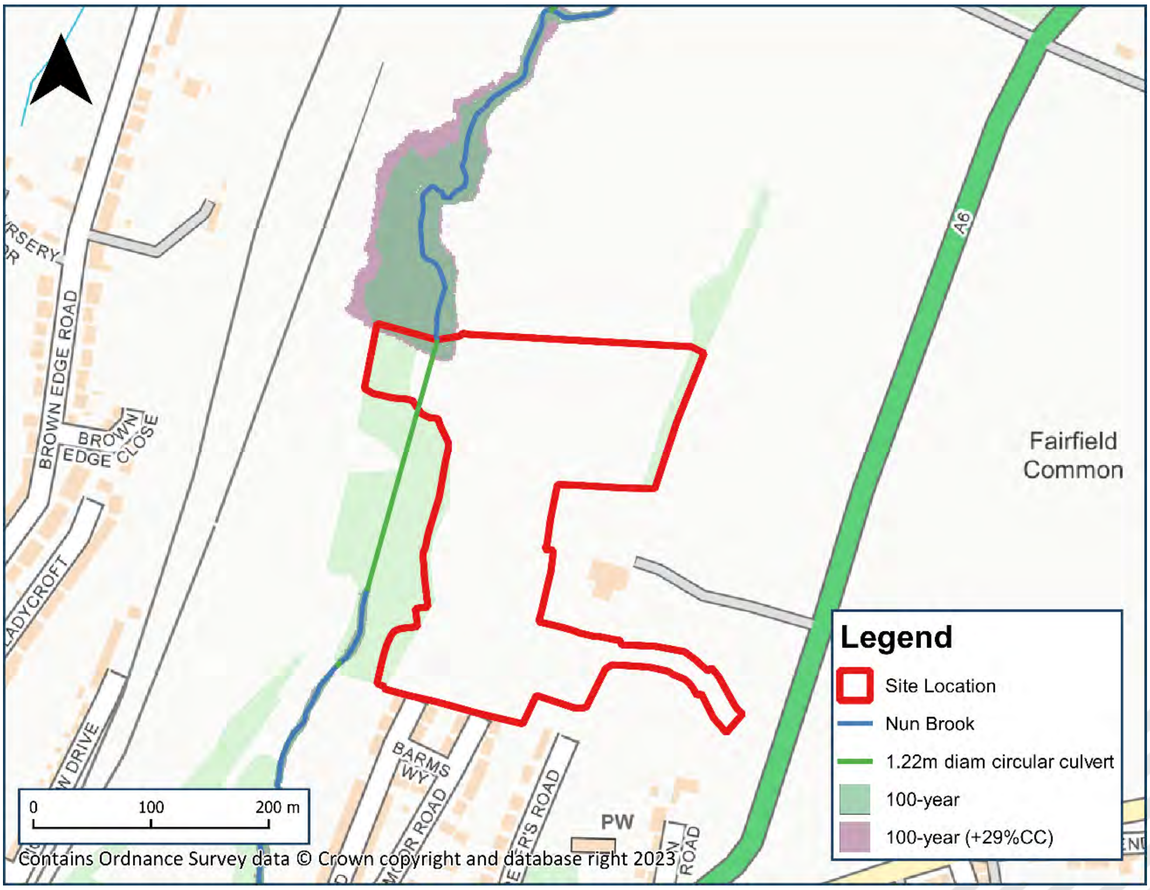



Figure 2-3: Baseline flood extent with climate change

### 2.2.2 Baseline flood depths

The flood depths within the site during the 100-year with 29% climate change flood event (i.e. the design event) are shown within Figure 2-4.

This shows that within the site, the maximum flood depths are upstream of the 1.22m diameter culvert inlet. The maximum flood depth in this area is 4.02m, within the area of low elevation surrounding the channel.

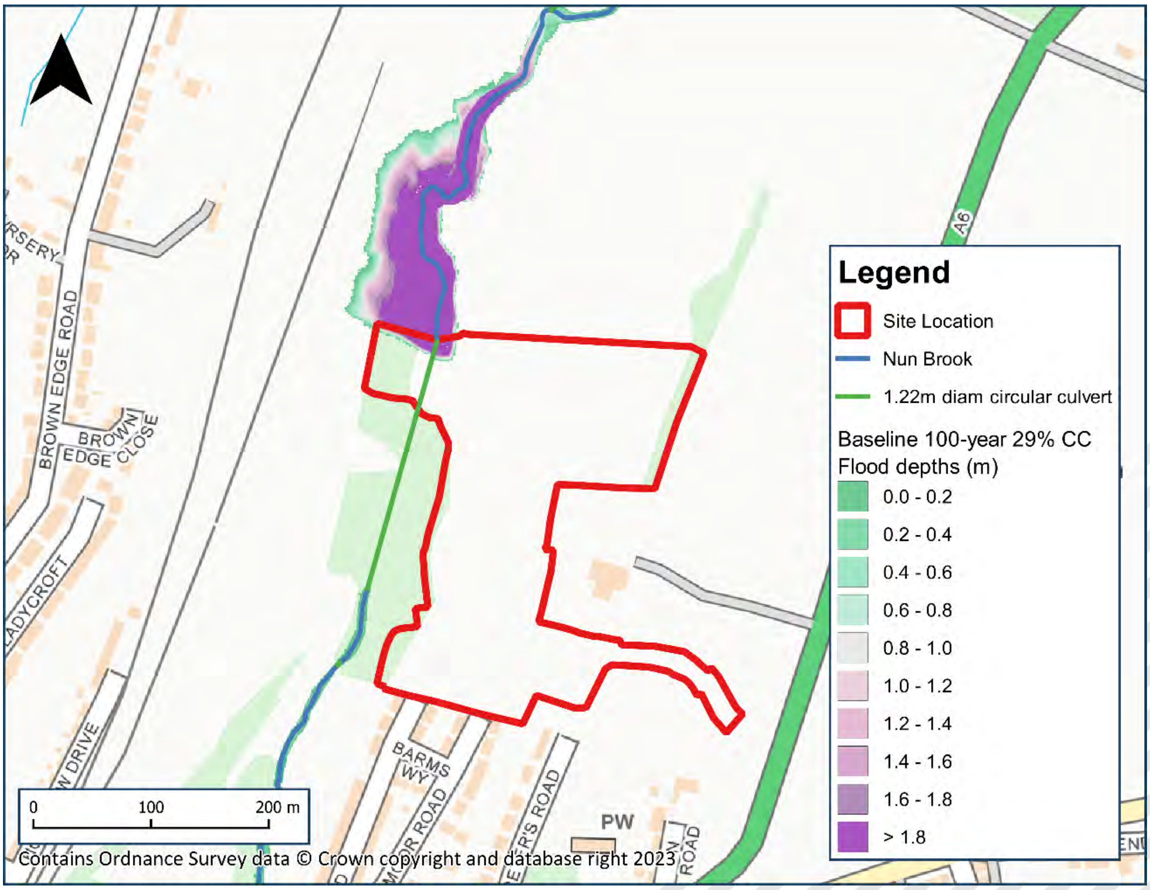



Figure 2-4: Baseline flood depths

| | |
|---|---|
| JBA Project Code | 2023s1142 |
| Contract | Hydraulic Modelling at Hogshaw Farm |
| Client | Barratt Homes Manchester |
| Date | January 2024 |
| Author | Ella Albrighton BSc |
| Reviewer / Sign-off | Amy Evans BSc MCIWEM C.WEM |
| Subject | Hydraulic Modelling at Hogshaw Farm, Buxton |

### 2.2.3 Baseline water levels

The water levels during the baseline 100-year with 29% climate change are shown in Figure 2-5. During the baseline 100-year with 29% climate change event, the peak water level onsite and at the inlet of the culvert is 299.90m AOD.

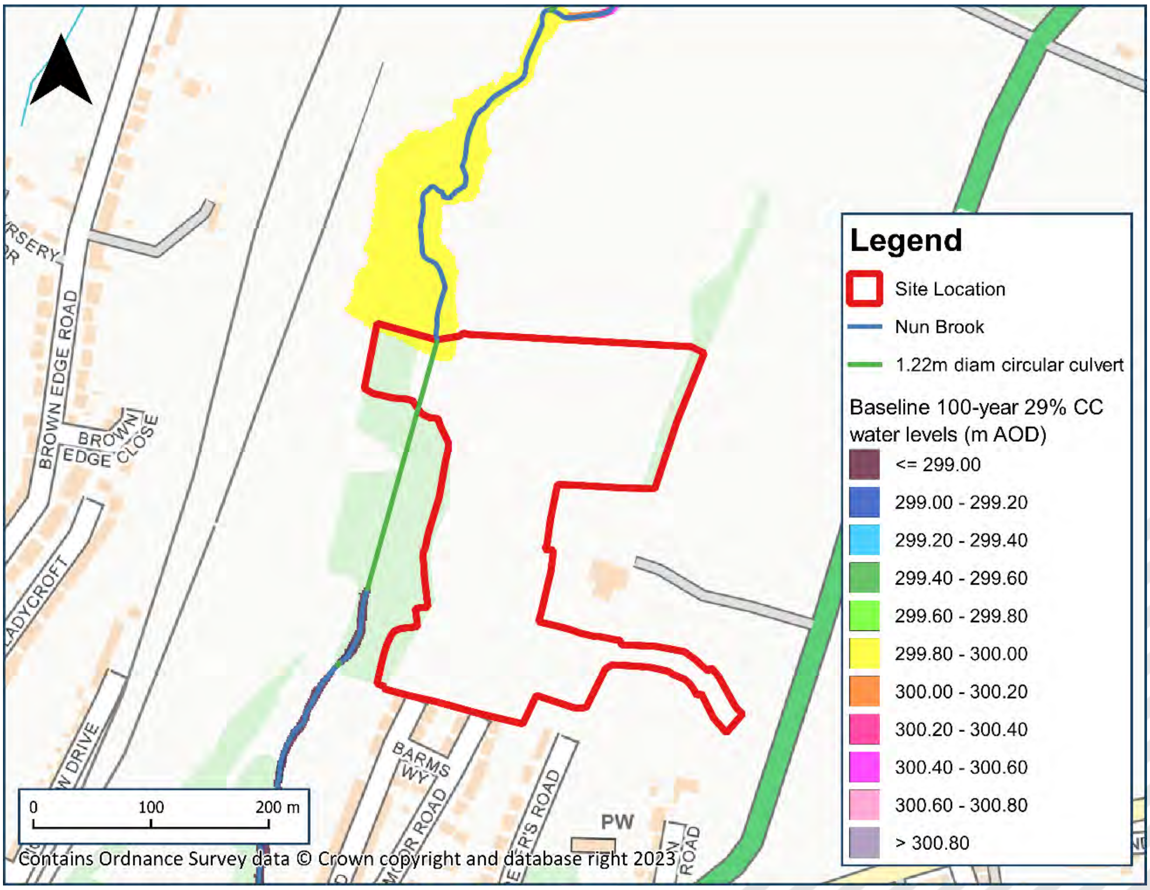



Figure 2-5: Baseline water levels

### 2.2.4 Baseline hazard to people

The fluvial hazard-to-people rating during a 100-year with 29% climate change flood scenario has been mapped using the formula as suggested in Defra's FD2321/TR2 "Flood Risk to People". The different hazard categories are shown in Table 2-1 and the hazard classification to the site during the 100-year with 29% climate change scenario is shown in Figure 2-6.

Table 2-1 Flood Risk to People Hazard to People

| Flood hazard rating depth x (velocity+0.5) +DF | Level of Flood Hazard Description | Class label |
|---|---|---|
| <0.75 | Low | Caution "Flood zone with shallow flowing water or deep standing water" |
| 0.75 to 1.25 | Moderate | Dangerous for some (i.e. Children) "Danger: flood zone with deep or fast flowing water" |
| 1.25 to 2.00 | Significant | Danger for most "Danger: flood zone with deep fast flowing water" |
| >2.00 | Extreme | Dangerous for all "Extreme danger: flood zone with deep fast flowing water" |
| Using the hazard equation HR = d*(v+0.5) + DF<br>Where d = depth of flooding (m) v = velocity of floodwaters (m/sec) DF = debris factor | | |

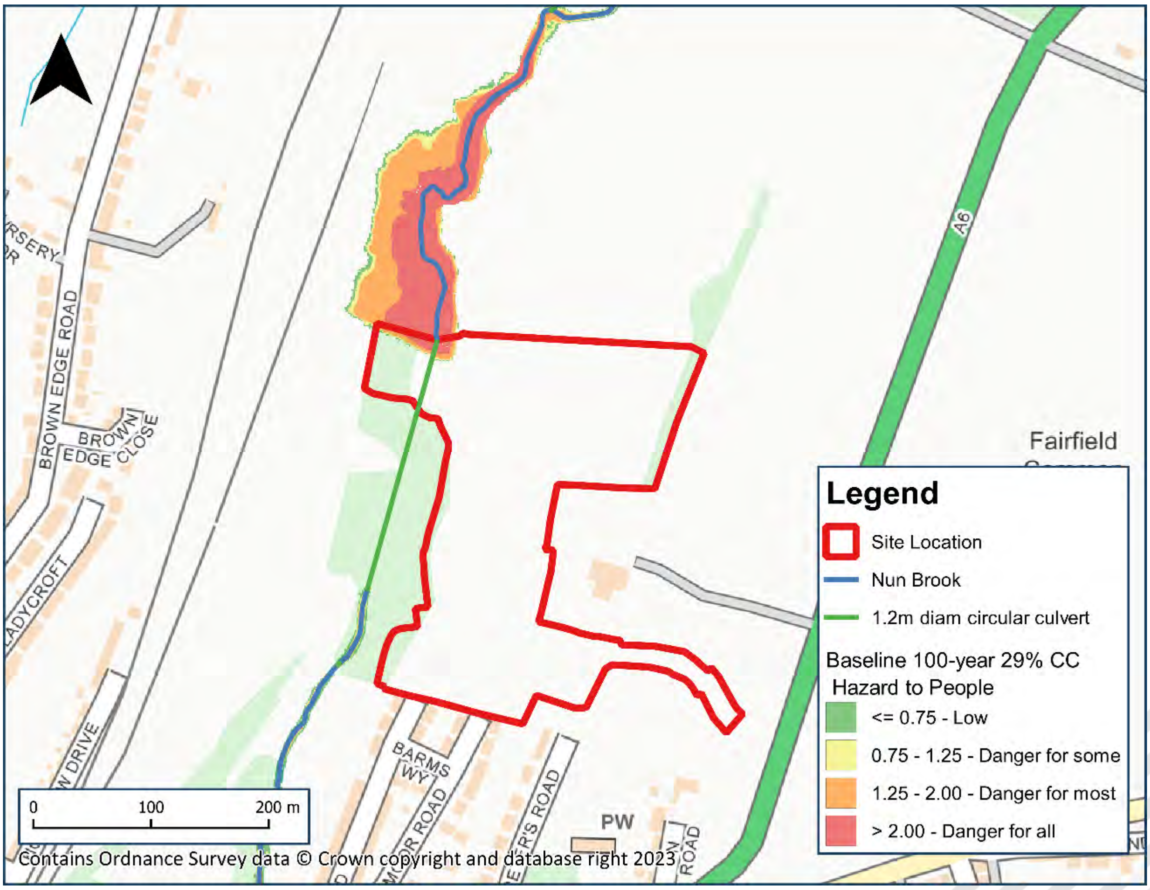



Figure 2-6: Baseline hazard to people

Figure 2-6 shows that during the baseline 100-year with 29% climate change event the north-western area of the site is partially within the 'danger for all' hazard category. However, this is primarily the channel and immediate floodplain of the Nun Brook.

### 2.3 Blockage analysis

The residual risk of a blockage at the inlet of the 1.22m diameter culvert has been considered as part of this study. In order to represent the worst-case scenario a 100% blockage at the structure has been modelled. Figure 2-7 shows the maximum flood extent during the 100% blockage at the structure during a 100-year with 29% climate change flood event. This shows that the flood extent is larger during this event where flows build up behind the inlet before eventually flowing overland to the downstream culvert extent where the Nun Brook becomes open channel.

Figure 2-8 shows the peak water levels associated with this residual event.

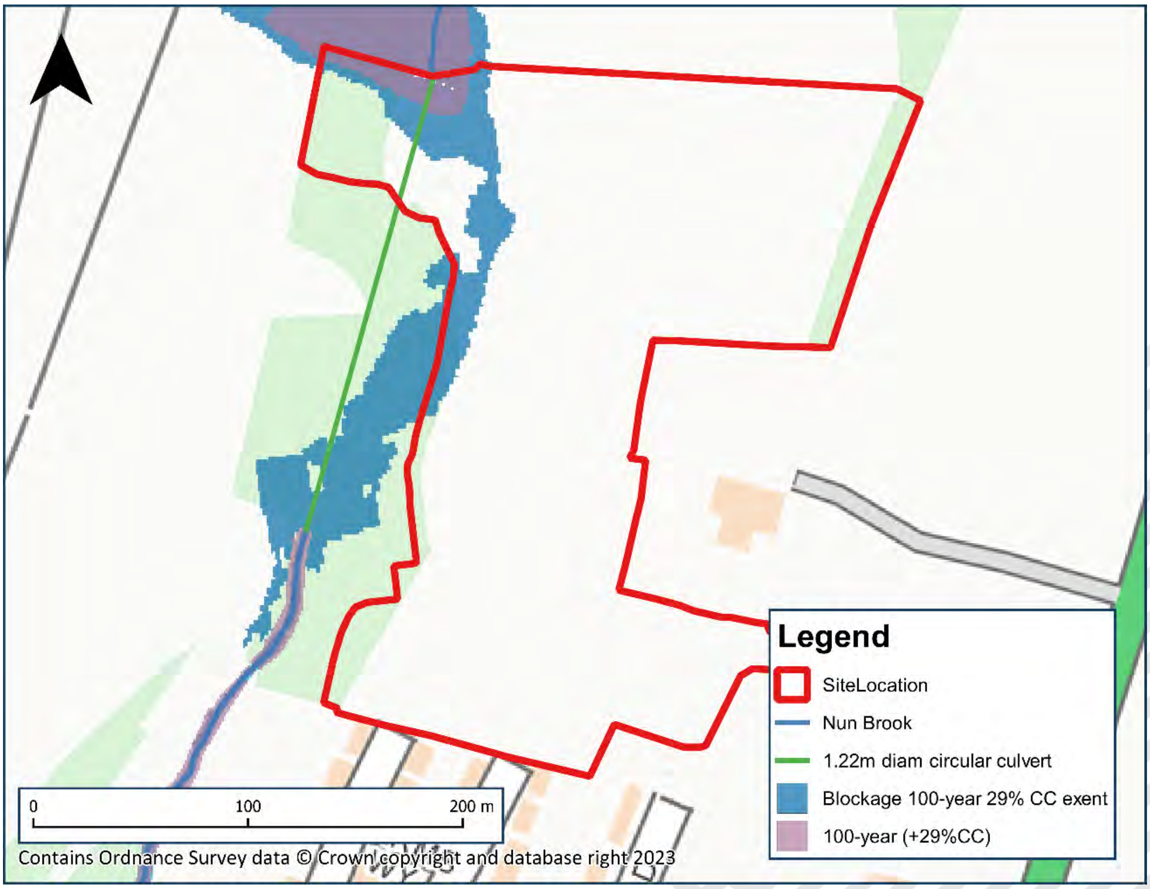



Figure 2-7: Blockage extent