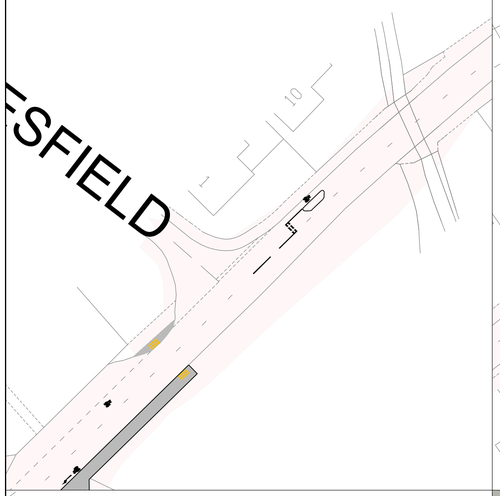
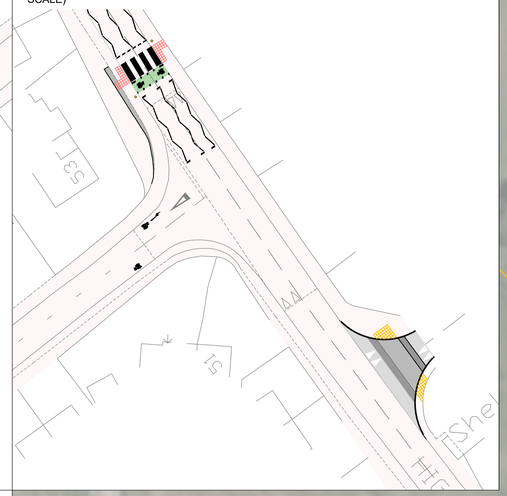
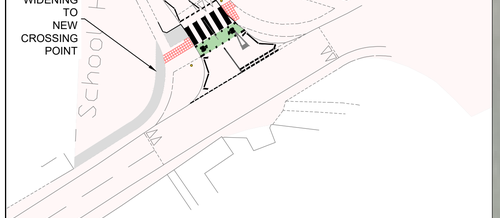
INSET B - TRAFFIC CALMING BUILD OUT PRIORITY NARROWING WITH CYCLE BYPASS (1:500 SCALE)



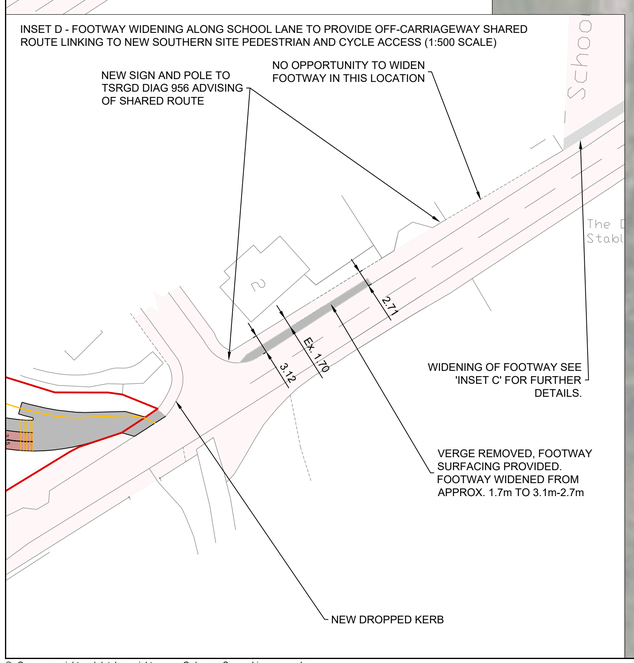
INSET A - NEW PARALLEL CROSSING LOCATED ON HIGH STREET TO LINK TO EXISTING SHARED ROUTE TO EASTERN SIDE OF CARRIAGEWAY. FOOTWAY WIDENING TO WEST OF CARRIAGEWAY SUBJECT TO FURTHER INVESTIGATION WITH CYCLE EGRESS ON HATTON'S ROAD FOR CYCLISTS TO USE NEW FACILITY (1:500 SCALE)



INSET B - PROPOSED PARALLEL ZEBRA CROSSING IN LOCATION OF EXISTING UNCONTROLLED PEDESTRIAN CROSSING POINT. CROSSING IS LOCATED ON AN EXISTING RAISED TABLE. FOOTWAY WIDENING PROPOSED IN VICINITY AND NEW BELISHA BEACONS (1:500 SCALE)



INSET D - FOOTWAY WIDENING ALONG SCHOOL LANE TO PROVIDE OFF-CARRIAGEWAY SHARED ROUTE LINKING TO NEW SOUTHERN SITE PEDESTRIAN AND CYCLE ACCESS (1:500 SCALE)



0 25 50 75 100 125m

Scale 1:1,250

Notes:

1. BASED ON OS MASTERMAP DATA AND TOPOGRAPHICAL SURVEY DATA PROVIDED BY LASER SURVEYS LTD WHERE AVAILABLE.
2. THIS IS DRAWING IS INDICATIVE AND ONLY WITH EXACT PLACEMENT OF TACTILE PAVING, AND KERBING CURRENTLY SHOW ON OS MASTERMAP SUBJECT TO AGREEMENT WITH LOCAL HIGHWAY AUTHORITY AND UPON RECEIPT OF TOPOGRAPHICAL SURVEY INFORMATION

TSRGD DIAG 967 ROUTE RECOMMENDED FOR PEDAL CYCLES ON THE MAIN CARRIAGEWAY OF A ROAD. SIGNAGE TO BE LOCATED AS SHOWN.

TSRGD DIAG 1057 CYCLE ROUTE MARKING AT REGULAR INTERVALS (100M) IN BOTH DIRECTIONS IN LOCATIONS WHERE OFF CARRIAGEWAY CYCLE ROUTE IS NOT POSSIBLE

CAMBRIDGESHIRE COUNTY COUNCIL PUBLICLY MAINTAINED HIGHWAY

SITE OWNERSHIP (INDICATIVE ONLY)

EXISTING PRoW (FOOTPATH) WITHIN SITE (INDICATIVE ONLY)

Rev.	Details	Drawn	Checked	Date

ROVIA

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Drawing Status: INFORMATION ONLY

Client: Bidwells

Project: Hattons Road, Longstanton

Drawing Title: Off-site Active Travel Improvement Proposals

Scale		Project Ref. No
1:1250 / 1:500	@ A1	260229

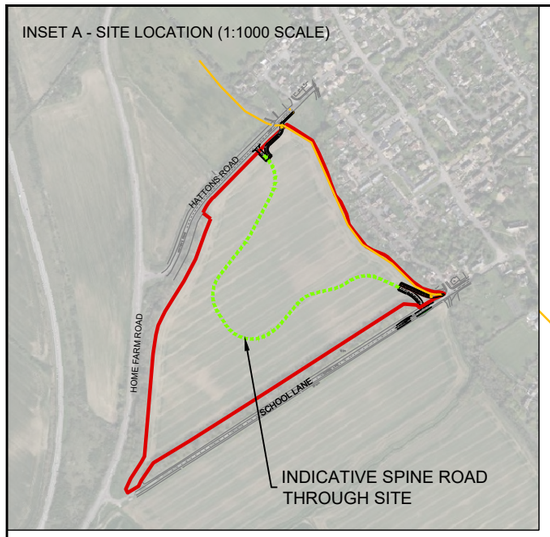
Designed	Drawn	Checked	Authorised
	TF	MM	
Date	Date 04.09.26	Date 04.09.26	Date

Drawing number: 260229-ROV-HGN-XXX-SK-TP-0005 Revision: P1

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Appendix B



N

2.4M X 120M VISIBILITY SPLAY

UNCONTROLLED PEDESTRIAN CROSSING

CYCLE ACCESS FROM HATTONS ROAD

ACTIVE TRAVEL CONNECTIONS TO BE ROUTED TO REAR OF EXISTING HEDGEROW AND TREES TO AVOID ECOLOGICAL IMPACT

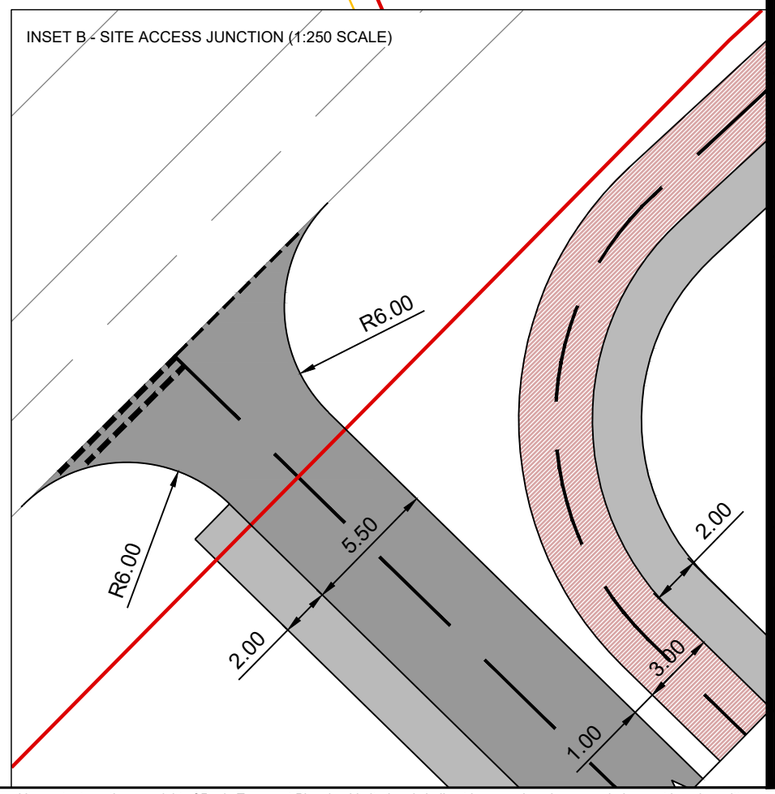
VEGETATION WITHIN VISIBILITY SPLAY TO BE TRIMMED BACK AND MAINTAINED WHERE NECESSARY

ROUTE OF EXISTING PRoW TO BE UNCHANGED

2.4M X 120M VISIBILITY SPLAY

0 10 20 30 40 50 60 70 80 90 100m

Scale 1:1,000



Notes:

THIS IS DRAWING IS FOR COMMENT ONLY SUBJECT TO:

1. RECEIPT OF HIGHWAY BOUNDARY DATA FROM CAMBRIDGESHIRE HIGHWAYS
2. REVIEW OF TITLE BOUNDARY / OWNERSHIP DETAILS
3. RECIEPT OF TOPOGRAPHICAL SURVEY INFORMATION
4. ROAD SAFETY AUDIT
5. LOCAL HIGHWAY AUTHORITY REVIEW / APPROVAL
6. FULL VERTICAL ALIGNMENT
7. FINAL DESIGN CHECK / REVIEW

SITE OWNERSHIP (INDICATIVE ONLY)

PROPOSED NEW CARRIAGEWAY

PROPOSED NEW FOOTWAY

PROPOSED NEW CYCLEWAY

EXISTING PRoW (FOOTPATH) WITHIN SITE (INDICATIVE ONLY)

Rev.	Details	Drawn	Checked	Date

ROVIA

WWW.ROVIA.CO.UK

Drawing Status: INFORMATION ONLY

Client: Bidwells

Project: Hattons Road, Longstanton

Drawing Title: Northern Site Access Hattons Road

Scale	Project Ref. No
1:1000 / 1:250 @ A3	260229

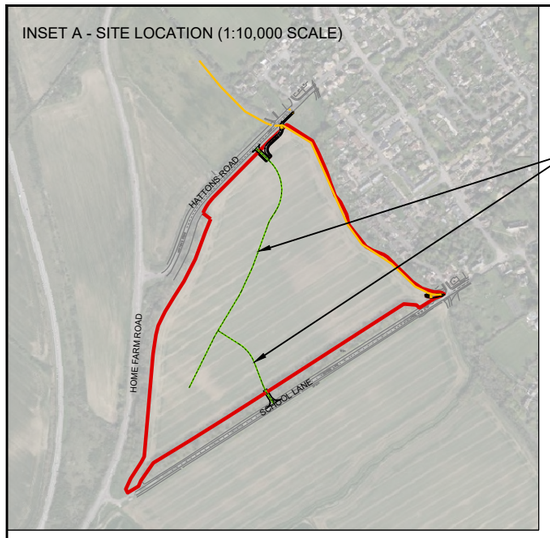
Designed	Drawn	Checked	Authorised
	TF	MM	
Date	Date	Date	Date
	22.07.26	22.07.26	

Drawing number: 260229-ROV-HGN-XXX-SK-TP-0002

Revision: P1

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INDICATIVE SPINE ROAD THROUGH SITE

EXISTING TRAFFIC CALMING FEATURE

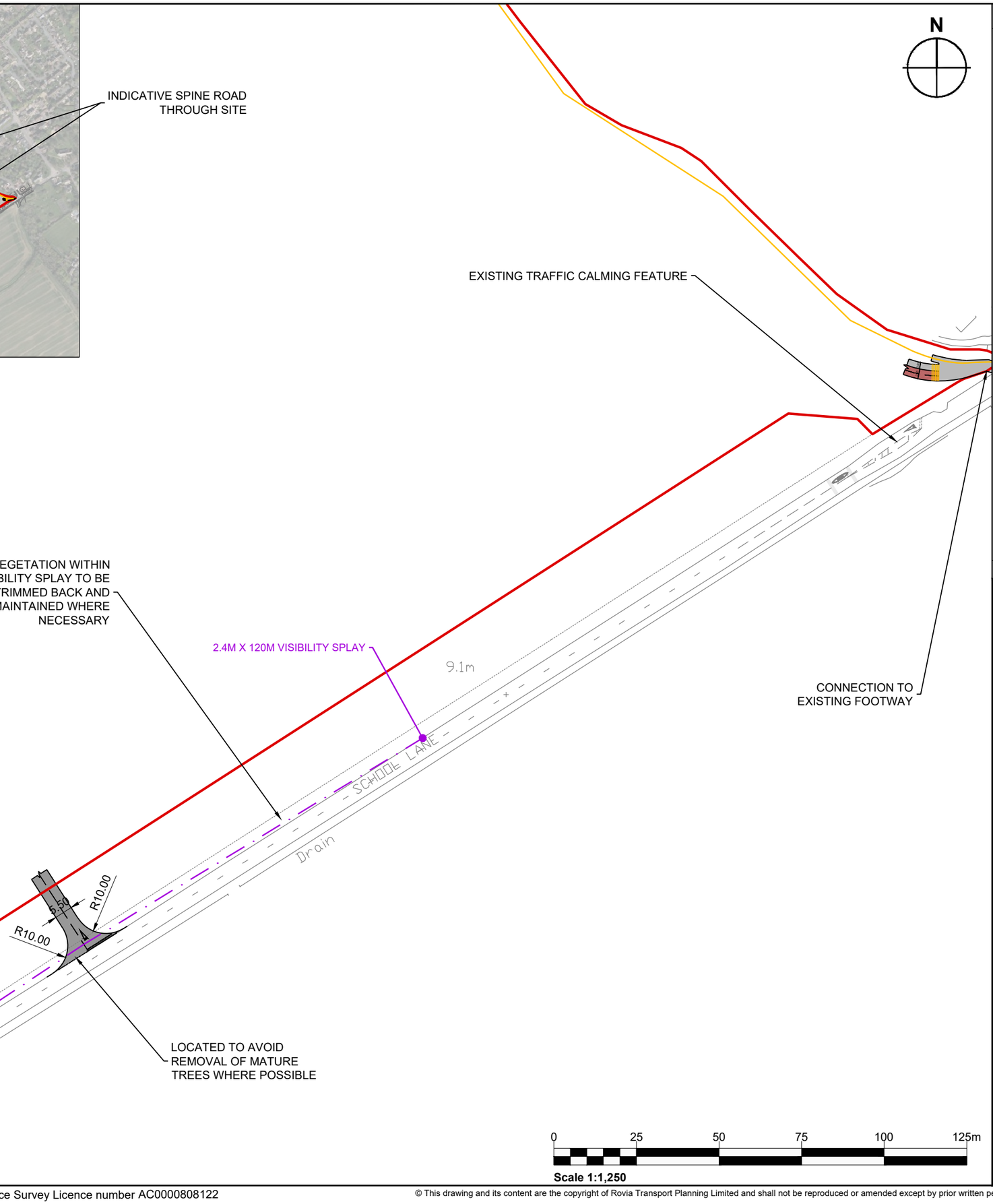
VEGETATION WITHIN VISIBILITY SPLAY TO BE TRIMMED BACK AND MAINTAINED WHERE NECESSARY

2.4M X 120M VISIBILITY SPLAY

2.4M X 120M VISIBILITY SPLAY

CONNECTION TO EXISTING FOOTWAY

LOCATED TO AVOID REMOVAL OF MATURE TREES WHERE POSSIBLE



Scale 1:1,250

Notes:

Based on Bidwells masterplan layout: MLA115350-A3-0201_A - 1

THIS IS DRAWING IS FOR COMMENT ONLY SUBJECT TO:
1. RECEIPT OF HIGHWAY BOUNDARY DATA FROM CAMBRIDGESHIRE HIGHWAYS
2. REVIEW OF TITLE BOUNDARY / OWNERSHIP DETAILS
3. RECIEPT OF TOPOGRAPHICAL SURVEY INFORMATION
4. ROAD SAFETY AUDIT
5. LOCAL HIGHWAY AUTHORITY REVIEW / APPROVAL
6. FULL VERTICAL ALIGNMENT
7. FINAL DESIGN CHECK / REVIEW

- SITE OWNERSHIP (INDICATIVE ONLY)
- PROPOSED NEW CARRIAGEWAY
- PROPOSED NEW FOOTWAY
- PROPOSED NEW CYCLEWAY
- EXISTING PRoW (FOOTPATH) WITHIN SITE (INDICATIVE ONLY)

Rev.	Details	Drawn	Checked	Date
P2	UPDATES TO INDICATIVE SPINE ROAD	TF	MM	01.09.26

ROVIA

WWW.ROVIA.CO.UK

Drawing Status: INFORMATION ONLY

Client: Bidwells

Project: Hattons Road, Longstanton

Drawing Title: Southern Site Access School Lane

Scale		Project Ref. No
1:1250	@ A3	260229

Designed	Drawn	Checked	Authorised
	TF	MM	
Date	Date	Date	Date
	22.07.26	22.07.26	

Drawing number: 260229-ROV-HGN-XXX-SK-TP-0003

Revision: P2

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APPENDIX C
TFLOOD RISK AND DRAINAGE TECHNICAL NOTE

Project Name:	Land South of Hattons Road, Longstanton
Document Reference:	1019.5022/TN/1
Document Name:	Technical Note
Prepared By:	Dannylee Shakespeare (September, 2026)
Checked By:	David Pearson (September, 2026)
Approved By:	Jon Soar (September 2026)

Revision Record				
Rev	**Date**	**By**	**Summary of Changes**	**Aprvd**
P01	04/09/2026	DLS	First issue.	JFS
P02	18/09/2026	DLS	Addressing comments to the introduction and update appendices.	JFS

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1. INTRODUCTION

1.1 This Technical Note has been prepared by Paul Basham Associates on behalf of Peterhouse to support civil engineering input to the Vision Document and Masterplan for the promotion of the site through the Greater Cambridge Local Plan at Land South of Hattons Road, Longstanton.

1.2 The Proposed Development is located to the southwest of the Cambridgeshire village of Longstanton, land south of Hattons Road. The site boundary size is approximately 12.09 ha and the land is currently an undeveloped open arable field of agricultural use.

1.3 The site has been indicated by the red line boundary demonstrated within *Figure 1*. The nearest postcode for the site is CB24 3EG.



Figure 1 Proposed Site Location

Site Promotion - Indicative Development proposals

1.4 The site is being investigated for residential development and is indicatively proposed to accommodate up to 190 dwellings. This quantum is not tested and is given at this early stage to frame the investigations and inform assessment of the site for potential future development. The current framework masterplan is included in **Appendix A** and is being used to inform this technical review.

1.5 Development proposals measure approximately 6.384 ha of the site (approximately 53% of the overall site boundary area) and would include provision for substantial public open space.

1.6 Principal access serving the site is proposed from Hattons Road with the potential for secondary access and linkage to School Lane.

2. SITE CONDITIONS

2.1 A Topographical survey has not yet been conducted for this site but open-source LIDAR data downloaded from the DEFRA website shows that the site falls from the southwest of the site to the northeastern boundary. The highest point on the site is at circa 10.00m AOD and the lowest point is circa 8.00m AOD. The LIDAR contours are presented on the Drainage Strategy plan in **Appendix B**.

2.2 The site is bound by Home Farm Road, Hattons Road and School Lane with a principal access proposed from Hattons Road.

2.3 The nearest watercourse runs along the northeastern boundary of the site and is an upstream connection to a series of balancing ponds running through the Longstanton area, shown in *Figure 2* below. It is a designated 'awarded' watercourse maintainable by the Local Authroity, South Cambridgeshire District Council.



Figure 2 Map of nearest water source

2.4 A review of the British Geological Survey (BGS) mapping shows that the proposed development has no superficial geology, but the bedrock is underlain by West Walton Formation and Ampthill Clay Formation (Undifferentiated) - Mudstone as seen below in *Figure 3*.



Figure 3 BGS Bedrock Geology

2.5 The British Geological Survey (BGS) mapping, shown in *Figure 4*, presents information on the nearest boreholes in and around the site. Borehole TL36NE47, located along the Northeast border of the site, indicates 0.4m of topsoil followed by 0.4m of clayey silt and then followed by 0.4m of silty sand 0.9m of stiff very silty clay. The borehole terminated at a depth of 2.1m b.g.l. and indicates that groundwater was not encountered, however the borehole was dug during a period of extended dry weather. Due to proximity to a watercourse, high groundwater would be anticipated during winter months.



Figure 4 BGS Borehole Viewer

2.6 DEFRA's magic map indicates that the site does not fall within a Source Protection Zone.

Infiltration Potential

2.7 Infiltration potential for the site is anticipated to be Unproductive due to the prevailing mudstone. Silty clay soils are expected to typically yield an infiltration coefficient between 1.0×10^{-8}m/s to 1.0×10^{-6}m/s. The standard cutoff for a minimum viable rate of infiltration is considered to be 1.0×10^{-6}m/s.

3. FLOOD RISK

Fluvial flooding

3.1 Flood mapping obtained from the government's 'flood map for planning' website shows flood zones with application of climate change, which indicates that the majority of the site falls in flood zone 1. A section along the northeastern boundary, bound by the awarded watercourse, is identified as flood zones 2 & 3. This is seen in *Figure 5* below.

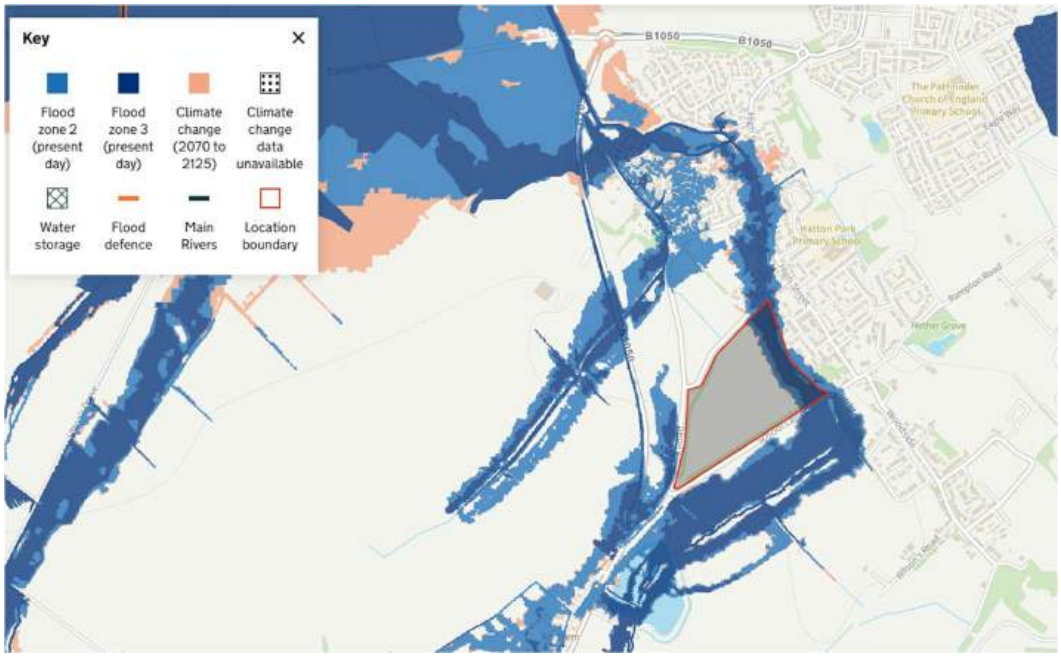


Figure 5 DEFRA's Map for Flooding

Fluvial flooding – Mitigation Measures and Considerations

3.2 Development proposals use the sequential approach to development siting all development in areas at the lowest flood risk.

Fluvial flooding – Residual Risk

3.3 The residual fluvial flood risk to the development is considered to be Very Low.

Surface water (pluvial) flooding

3.4 Flood mapping obtained from the government's 'flood map for planning' website shows surface water flood risk with application of climate change, which indicates the majority of the site is not at risk of flooding. Some localised and isolated pockets of flood risk are identified but this would be dispersed by developing the site. This is shown in *Figure 6* below.

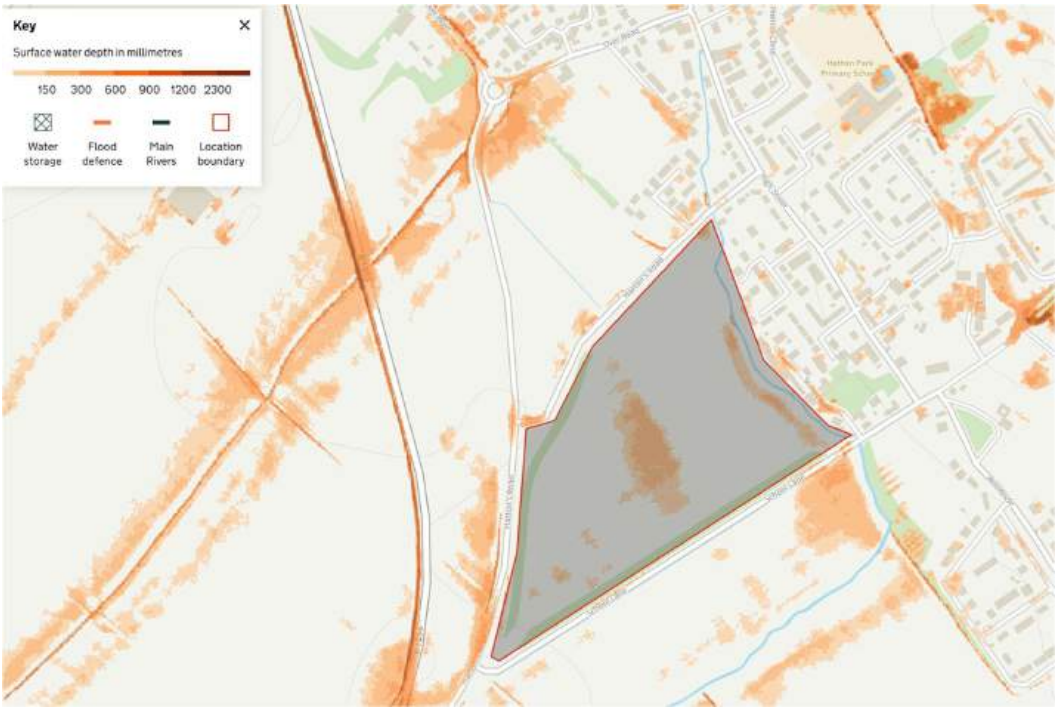


Figure 6 DEFRA Surface Water Map

Surface water flooding – Mitigation Measures and Considerations

3.5 Isolated areas of surface water flooding are encountered but determined to be localised run-off occurring due to, and contained by, the natural topography. These areas will be mitigated through the drainage design to serve the proposed development.

Surface water flooding – Residual Risk

3.6 Based on review of the above information, the site is considered to be at Very Low risk of flooding from surface water.

Reservoir Flooding

3.7 The Government's long-term flood risk mapping for reservoir flooding indicates the site is not considered to be at risk from reservoir flooding. This is shown in *Figure 7* below.



Figure 7 GOV.UK Map for Reservoir flooding

Groundwater Flooding

3.8 The Government's long term flood risk mapping indicates there is no identified risk of groundwater flooding as demonstrated in *Figure 8* below.

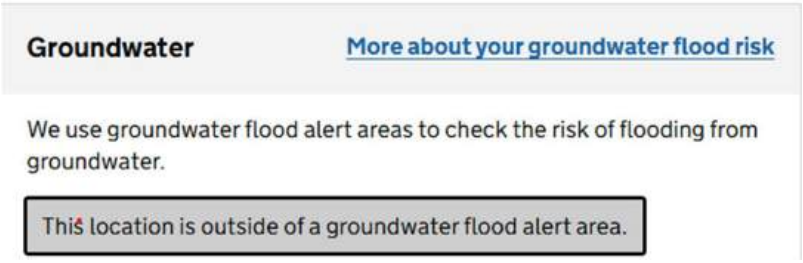


Figure 8 GOV.UK Ground Water Flood Risk

4. SURFACE WATER STRATEGY

Sustainable drainage principles

4.1 Sustainable drainage systems (SuDS) are designed to manage storm water as close to its source as possible to mimic natural drainage arrangements and where possible, encourage its infiltration, attenuation and passive treatment. SuDS should be designed to both manage the flood and pollution risks resulting from urban runoff and to contribute wherever possible to environmental enhancement and place making. With this in mind, the multi-functionality and multiple benefits of SuDS should always be considered. There are four pillars of SuDS that should consider the delivery of multiple benefits through design. These are as defined by *Figure 9* below.

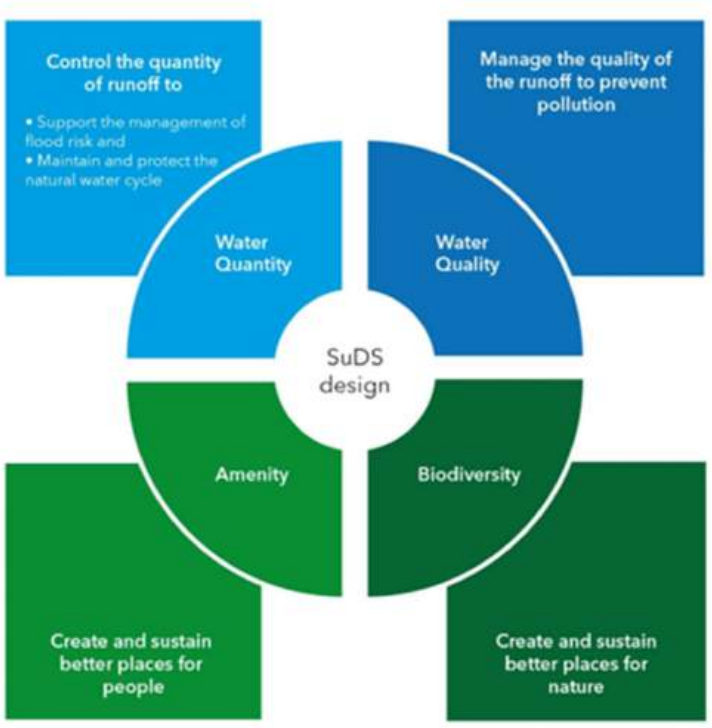


Figure 9: *The four pillars of SuDS*

4.2 Runoff from development should be discharged to the final destinations in accordance with the National Standards for sustainable drainage systems (NSS) to the hierarchy in order of preference:

- priority 1: collected for non-potable use
- priority 2: infiltrated to ground
- priority 3: discharged to an above ground surface water body
- priority 4: discharged to a surface water sewer, or other piped surface water drainage system
- priority 5: discharged to a combined sewer

4.3 A rainwater harvesting system should be considered for greywater reuse in any associated communal use but for residential use mechanical rainwater harvesting systems are expensive to install and maintain, and can place a burden on the homeowner or occupant. Any individually installed system cannot be relied upon in perpetuity; at end of life there's no means to ensure it is replaced.

4.4 Rainwater butts can provide a passive and low maintenance alternative and should be considered where they can be secure within a plot curtilage. They cannot be considered to provide surface water storage but are advisable to encourage reuse.

SuDS features and disposal

4.5 SuDS principles must be applied for the control, management and storage of all design rainfall events including making allowance for climate change. They should also be used to convey flows towards a point of outfall(s) from the site, prioritising infiltration for disposal where it proves feasible.

4.6 Infiltration is considered unviable based on the identified geology confirming the local soil types are mudstone based. The soil type is considered unproductive.

4.7 Principally, the surface water runoff shall be controlled and attenuated in a vegetated detention basin prior to discharging from site at a restricted rate via a flow control manhole, to the awarded watercourse.

4.8 All surface water runoff up to and including the 1 in 100 year return period (1.0% AEP) with allowance for an additional 40% climate change, shall be restricted to the greenfield rate of runoff. The total site catchment measured contributing to the drainage system is 9.847 ha and is therefore calculated to be a rate of 26.20 L/s. Refer to **Appendix C** for the estimated greenfield rate of runoff. This can be measured as 2.66 L/s/ha, the lesser against the standard 3.00 L/s/ha, so in accordance with NSS Standard 3.19, the discharge rate is proposed to be 29.54 L/s and applied to the respective catchment areas of the development.

4.9 Storage associated with the development is estimated to require 9,588.0m³ which will be delivered in a mix of drainage features, predominately within a vegetated detention basin. Private driveways and private shared surface roads and parking courtyards will be of permeable paving to provide additional storage at source, capturing runoff where rainfall lands. A calculation of the surface water storage volume estimation is provided in **Appendix D**.

5. FOUL WATER DRAINAGE

5.1 The site is a Greenfield arable land use with no sewers on the site.

5.2 Longstanton falls within the drainage catchment served by the Lowestoft Water Recycling Centre (WRC). Anglian Water's published data confirms there is insufficient capacity within the receiving WRC. A pre-planning enquiry will be needed to evaluate the potential options to drain the site.

5.3 Searches are required to identify the nearest public foul water sewer. It is anticipated a pumping station may be necessary to communicate waste flows from the development.

5.4 Anglian Water's Adoptable pumping station design criteria provides specific methodology for calculation of wastewater flows. For a development of 190 dwellings this would equate to a design pumped rate of flow of 3.23 L/s.

5.5 Similarly Anglian Water's criteria require provision for 4 hours emergency storage. For a development of 400 dwellings this would equate to 11,637.5 L (11.6m³).

5.6 Application of the Adoptable pumping station design criteria is predicated on the onsite sewer network being offered for adoption. Adoption would be subject to a S.104 agreement with the Water Authority under the Water Industry Act 1991.

5.7 The discharge of flow would be subject to a S.106 agreement with the Water Authority under the Water Industry Act 1991.

Appendix A

PLANNING ISSUE, NOT FOR CONSTRUCTION



KEY

- Site Boundary
- Primary Access
- Cycle/Pedestrian Access
- Developable Area
- Development Frontages
- Development Road
- Private Drives
- Greenway
- Informal Footpath
- Play Area
- Conservation Area
- Grade I Listed Building
- Grade II Listed Building
- Existing Public Footpath
- Cycle route
- Bus Stop
- SuDS
- Existing Vegetation
- Proposed Vegetation
- Proposed Trees
- Proposed Open Space
- Flood Zone 2
- Flood Zone 3

Rev.	Date.	Details.
C	21/09/2026	Updated Drainage Strategy & Layout
C	08/09/2026	Updated Drainage Strategy
B	02/09/2026	Updated Shared Driveway
A	03/08/2026	Updated Built Form and Flood Risk

GENERAL
Do not scale from this drawing.
All dimensions to be checked on site.
This plan is to be read with all accompanying documentation.
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Masterplanning, Landscape & Assessment
Bidwell House, Trumpington Road, Cambridge, CB2 9LD

HATTON ROAD, LONGSTANTON

FRAMEWORK MASTERPLAN

Bar Scale: NOT TO SCALE
Job Code: 11256
OS License Number: 100017734
Project Phase: PLANNING
Date: 08.09.26
Drawn By: MW
Checked By: TB
Drawing Number: MLA115350-A3-0201
Revision: D

Appendix B

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NORTH

HATTONS ROAD

Detention Basin 3
Q = 12.17 L/s
Base Area 3,640.0m²
Depth 1.20m (0.90m Max. water depth with 0.30m freeboard)
Side slopes of 1 in 4
Total storage volume 4,077.0m³
373.0m³ within permeable paving
3,704.0m³ within detention basin (shown indicatively)

Catchment 3
Built form 2.400 ha
POS 1.555 ha
Total area 3.955 ha

Total Site Catchment Area
To drain by gravity outfall to watercourse
98,465.0m² (9.847 ha)
Impermeable Catchment = 6.384 ha
Discharge Rate (3.0 L/s/ha) = 29.54 L/s

Interception storage
Interception required up to 63,840.0m²
Detention basin unlined (x5 base area)
= 38,485.0m²
Permeable paving (x2 surface area)
Estimated area of 8,867.0m² = 17,734.0m²
Interception provided, est.
38,485.0 + 17,734.0 = 56,219.0m²

Catchment 2
Built form 2.515 ha
POS 0.361 ha
Total area 2.876 ha

Detention Basin 2
Q = 9.25 L/s
Base Area 1,589.0m²
Depth 1.20m (0.90m Max. water depth with 0.30m freeboard)
Side slopes of 1 in 4
Total storage volume 2,123.0m³
315.0m³ within permeable paving
1,808.0m³ within detention basin (shown indicatively)

Catchment 1
Built form 1.469 ha
POS 1.235 ha
Total area 2.704 ha

Detention Basin 1
Q = 8.12 L/s
Base Area 2,167.0m²
Depth 1.20m (0.90m Max. water depth with 0.30m freeboard)
Side slopes of 1 in 4
Total storage volume 2,428.0m³
243.0m³ within permeable paving
2,185.0m³ within detention basin (shown indicatively)

General Notes

1. This drawing is intended to be read in conjunction with all relevant architects, engineers, services and specialist drawings, details and specifications.
2. Any variations or discrepancies between these drawings in terms of dimensions or details should be drawn to the attention of the architect and/or the engineer for clarification.
3. All figured dimensions to be taken in preference to scaled dimensions. Do not scale this drawing.
4. Paul Basham Associates accepts no responsibility for the accuracy of background information produced by third parties – this must be treated as indicative only. Third party plans are included as per the following:
5. This drawing should only be used for construction if the project phase in the title frame below is shown as "construction". Paul Basham Associates take no responsibility for construction works undertaken to drawings which are not marked under this phase.

Drainage Legend

- Application Site Boundary
- Proposed basins
- Indicative vegetated swale
- Catchment 1 Area
- Catchment 2 Area
- Catchment 3 Area
- Flood Zone 2 (obtained from DEFRA website)
- Flood Zone 3 (obtained from DEFRA website)
- LiDAR data major contour (2.5m) (obtained from DEFRA website)
- LiDAR data minor contours (0.5m) (obtained from DEFRA website)
- Overland Exceedance Flow Routes

1:1250 0m 50m

PRELIMINARY
DRAWING/DESIGN IS STILL 'IN DEVELOPMENT'
YOU ARE ADVISED TO MAKE DUE ALLOWANCE

Rev	Description	Date	By	Appr
P02	Basins split to form a blue corridor and indicative swales shown.	18/09/2026	DLS	JFS
P01	First issue.	04/09/2026	DP	JFS

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Client: PETERHOUSE

Project Name: LAND SOUTH OF HATTONS ROAD, LONGSTANTON

Title: DRAINAGE STRATEGY

Project Phase: PRELIMINARY

Date Created	Drawn By	Approved By	Suitability Code
03.09.2026	DP	JFS	S4

PBA Project Number	Scale	
1019.0022	1:1250	(AT A1)

PBA Drawing No:	Revision
1019.5022.0501	P02

QMS2010/v9/020525/IDR

Appendix C

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

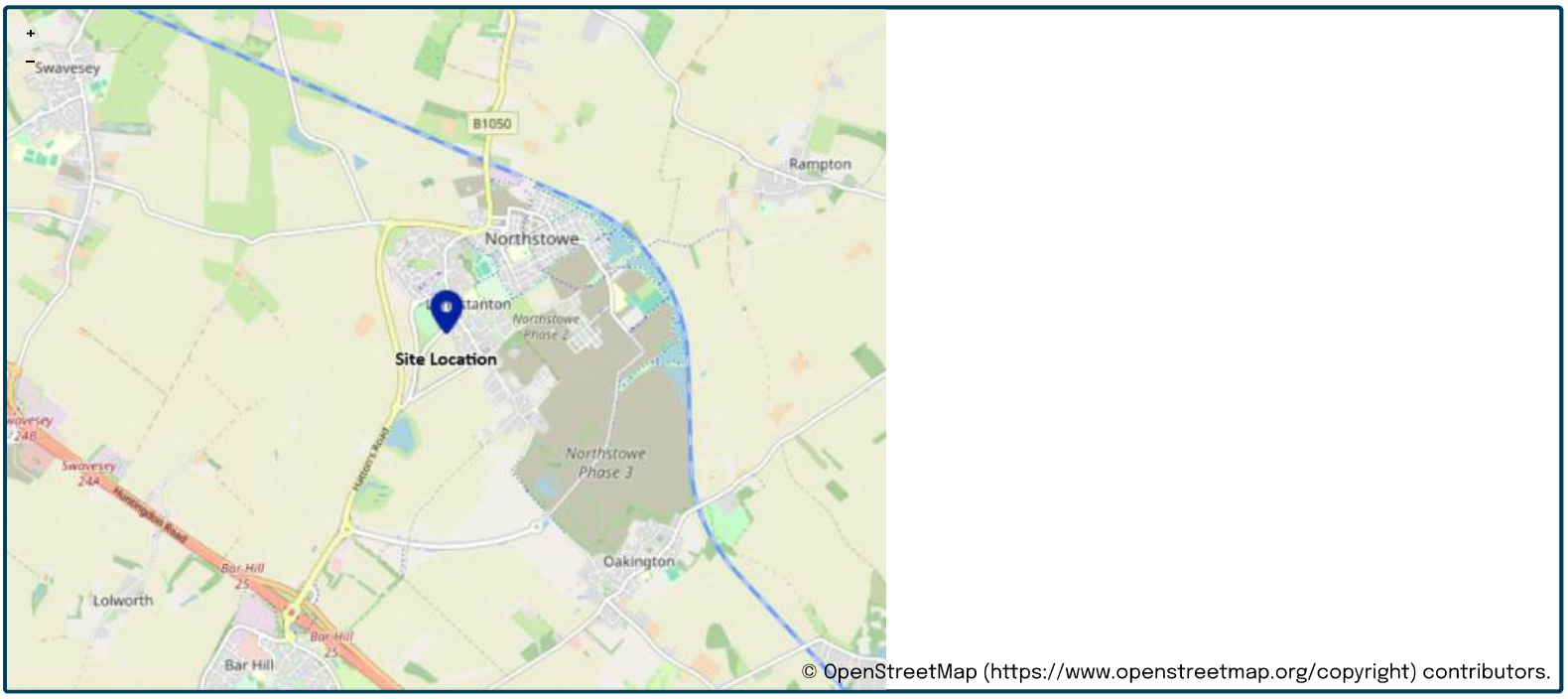
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	05/09/2026
Calculated by	JFS
Reference	1019.5022
Model version	2.2.3

Location

Site name	Hattons Road
Site location	Longstanton



Site easting (British National Grid)	539555
Site northing (British National Grid)	266389

Site details

Total site area (ha)	9.847 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	554 mm		
BFIHOST19scaled	0.261		
QMed-QBar conversion	1.124		1.124
QMed (l/s)	26.2 l/s		
QBar (FEH statistical 2025) (l/s)	29.4 l/s		

Growth curve factors

	My value		Map value
Hydrological region	5		5
1 year growth factor	0.87		
2 year growth factor	0.89		
10 year growth factor	1.65		
30 year growth factor	2.45		
100 year growth factor	3.56		
200 year growth factor	4.21		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	25.6 l/s
Flow rate 2 year (l/s)	26.2 l/s
Flow rate 10 years (l/s)	48.5 l/s
Flow rate 30 years (l/s)	72.1 l/s
Flow rate 100 years (l/s)	104.7 l/s
Flow rate 200 years (l/s)	123.8 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://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 uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix D

Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	18/09/2026
Calculated by	JFS
Reference	1019.5022
Model version	2.2.3

Location

Site name	Catchment 1
Site location	Hattons Rd, Longstanton



Site easting (British National Grid)	539469
Site northing (British National Grid)	266269

Site areas

Total site area (ha)	2.704	ha

Roof area

Total roof area (ha)	1.029	ha
Contributing roof area (ha)	1.029	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.44	ha
Contributing paved area (ha)	0.44	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	1.235	ha
Contributing grass / vegetated area (ha)	1.235	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	2.704	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	2:1	
Storage design depth (m)	.9	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	Default 3l/s/ha

Default 3l/s/ha

Total area for greenfield runoff calculation (ha)	2.704 ha		2.704
Flow rate (default) (l/s)	8.11 l/s		

Final discharge rate

Runoff calculation method	Default 3l/s/ha
Design flow rate (l/s)	8.1 l/s

Blockage risk

Specify the method	Flow rate		
Minimum discharge flow rate to prevent blockage	2l/s		
	My value		Calculated value
Design orifice diameter (mm)	64 mm		64
Flow rate of orifice (l/s)	7.98 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	FEH_Point_Rainfall_FEH22_AM_539562_266389.csv
Distance from FEH location to site (km)	0.2 km
Climate change allowance factor	140%
Specify the runoff method from grass / vegetated areas	Fixed percentage - based on rainfall event depth and SPR

	My value	Map value
How should SPR be derived?	Estimate using BFI	
BFIHOST19scaled	0.261	
SPR	0.546	

Model results

- **Maximum discharge flow rate:** 8.0 (l/s)
- **Outflow orifice diameter:** 64 (mm)
- **Storage base length:** 69 (m)
- **Storage base width:** 35 (m)
- **Storage base area:** 2412 (m^2)
- **Storage total volume:** 2428 (m^3)
- **Storage total water volume:** 2428 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	2160	3.7	0.22	553	553
2	1080	4.4	0.29	732	732
10	1080	6.2	0.55	1429	1429
30	1080	7.1	0.71	1878	1878
100	1080	8.0	0.90	2428	2428
200	1080	8.6	1.03	2826	2826

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://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 uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

HR Wallingford are not responsible for any rainfall data shared that is subject to licensing terms imposed by UK Centre for Ecology & Hydrology's Flood Estimation Handbook web service (https://fehweb.ceh.ac.uk/Home/Terms (https://fehweb.ceh.ac.uk/Home/Terms)).

Appendix A - Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.95	9.66	24.08	33.28	43.29	49.24
30	0.5	7.55	12.18	30.59	42.53	55.80	63.63
60	1	9.22	14.84	37.03	51.69	68.26	78.13
120	2	16.09	22.75	48.71	65.10	83.43	94.67
180	3	20.18	27.38	55.29	72.69	92.22	104.38
240	4	22.97	30.52	59.68	77.76	98.21	111.10
360	6	26.56	34.52	65.28	84.20	105.98	120.09
540	9	29.67	38.00	70.11	89.87	112.84	128.35
720	12	31.66	40.22	73.19	93.51	117.28	133.74
900	15	33.06	41.80	75.42	96.08	120.53	137.62
1080	18	34.18	43.06	77.18	98.14	123.06	140.66
1440	24	35.99	45.08	79.94	101.42	126.88	145.21
1800	30	37.50	46.76	82.25	104.09	129.99	148.61
2160	36	38.84	48.26	84.32	106.48	132.76	151.52
2880	48	41.27	50.97	88.12	110.81	137.70	156.51
3600	60	43.58	53.58	91.80	115.02	142.32	161.06
4320	72	45.77	56.07	95.35	119.08	146.72	165.34
5040	84	47.94	58.52	98.85	123.07	150.98	169.46
5760	96	50.08	60.96	102.34	127.02	155.16	173.49

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	4.25	6.90	17.20	23.77	30.92	35.17
30	0.5	5.39	8.70	21.85	30.38	39.86	45.45
60	1	6.58	10.60	26.45	36.92	48.76	55.81
120	2	11.50	16.25	34.79	46.50	59.59	67.62
180	3	14.42	19.56	39.49	51.92	65.87	74.56
240	4	16.41	21.80	42.63	55.54	70.15	79.36
360	6	18.97	24.66	46.63	60.14	75.70	85.78
540	9	21.19	27.14	50.08	64.19	80.60	91.68
720	12	22.61	28.73	52.28	66.79	83.77	95.53
900	15	23.61	29.86	53.87	68.63	86.09	98.30
1080	18	24.41	30.76	55.13	70.10	87.90	100.47
1440	24	25.71	32.20	57.10	72.44	90.63	103.72
1800	30	26.79	33.40	58.75	74.35	92.85	106.15
2160	36	27.74	34.47	60.23	76.06	94.83	108.23
2880	48	29.48	36.41	62.94	79.15	98.36	111.79

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
3600	**60**	31.13	38.27	65.57	82.16	101.66	115.04
4320	**72**	32.70	40.05	68.11	85.06	104.80	118.10
5040	**84**	34.24	41.80	70.61	87.91	107.84	121.04
5760	**96**	35.77	43.54	73.10	90.73	110.83	123.92

Surface water storage volume design tool

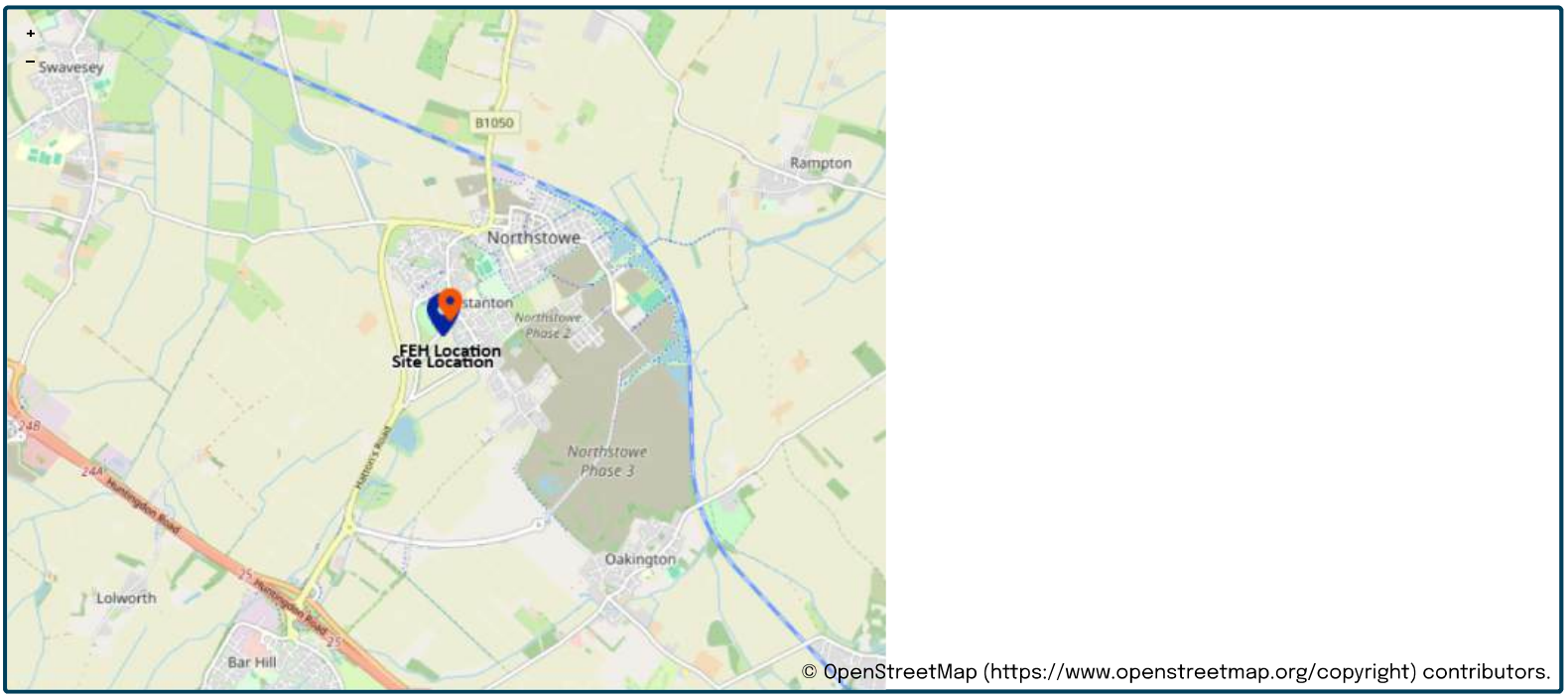
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	18/09/2026
Calculated by	JFS
Reference	1019.5022
Model version	2.2.3

Location

Site name	Catchment 2
Site location	Hattons Rd, Longstanton



Site easting (British National Grid)	539507
Site northing (British National Grid)	266355

Site areas

Total site area (ha)	3.085	ha

Roof area

Total roof area (ha)	1.76	ha
Contributing roof area (ha)	1.76	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.755	ha
Contributing paved area (ha)	0.755	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0.57	ha
Contributing grass / vegetated area (ha)	0.57	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	3.085	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Rectangular / square
Storage base length to width ratio	3:1
Storage design depth (m)	0.9 m
Storage side slope (1 in x)	1 in 3
Storage voids ratio (%)	100% (all voids)
Storage volume design return period (years)	1:100 years

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	Default 3l/s/ha

Default 3l/s/ha

Total area for greenfield runoff calculation (ha)	3.085 ha		3.085
Flow rate (default) (l/s)	9.25 l/s		

Final discharge rate

Runoff calculation method	Default 3l/s/ha
Design flow rate (l/s)	9.3 l/s

Blockage risk

Specify the method	Flow rate		
Minimum discharge flow rate to prevent blockage	2l/s		
	My value		Calculated value
Design orifice diameter (mm)	69 mm		69
Flow rate of orifice (l/s)	9.26 l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file
	FEH_Point_Rainfall_FEH22_AM_539562_266389.csv
Distance from FEH location to site (km)	0.1 km
Climate change allowance factor	140%
Specify the runoff method from grass / vegetated areas	Fixed percentage - based on rainfall event depth and SPR

	My value	Map value
How should SPR be derived?	Estimate using BFI	
BFIHOST19scaled	0.261	
SPR	0.546	

Model results

- **Maximum discharge flow rate:** 9.3 (l/s)
- **Outflow orifice diameter:** 69 (mm)
- **Storage base length:** 97 (m)
- **Storage base width:** 32 (m)
- **Storage base area:** 3146 (m^2)
- **Storage total volume:** 3152 (m^3)
- **Storage total water volume:** 3152 (m^3)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m^3)	Max storage volume (m^3)
1	1800	4.5	0.24	776	776
2	1440	5.2	0.31	1004	1004
10	1080	7.2	0.56	1899	1899
30	1080	8.2	0.72	2466	2466
100	1080	9.3	0.90	3152	3152
200	1080	9.9	1.02	3642	3642

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m^3 value, unless storage volumes are less than 10 m^3, in which case, storage volumes are provided to 1 decimal place.

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Appendix A - Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.95	9.66	24.08	33.28	43.29	49.24
30	0.5	7.55	12.18	30.59	42.53	55.80	63.63
60	1	9.22	14.84	37.03	51.69	68.26	78.13
120	2	16.09	22.75	48.71	65.10	83.43	94.67
180	3	20.18	27.38	55.29	72.69	92.22	104.38
240	4	22.97	30.52	59.68	77.76	98.21	111.10
360	6	26.56	34.52	65.28	84.20	105.98	120.09
540	9	29.67	38.00	70.11	89.87	112.84	128.35
720	12	31.66	40.22	73.19	93.51	117.28	133.74
900	15	33.06	41.80	75.42	96.08	120.53	137.62
1080	18	34.18	43.06	77.18	98.14	123.06	140.66
1440	24	35.99	45.08	79.94	101.42	126.88	145.21
1800	30	37.50	46.76	82.25	104.09	129.99	148.61
2160	36	38.84	48.26	84.32	106.48	132.76	151.52
2880	48	41.27	50.97	88.12	110.81	137.70	156.51
3600	60	43.58	53.58	91.80	115.02	142.32	161.06
4320	72	45.77	56.07	95.35	119.08	146.72	165.34
5040	84	47.94	58.52	98.85	123.07	150.98	169.46
5760	96	50.08	60.96	102.34	127.02	155.16	173.49

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	4.25	6.90	17.20	23.77	30.92	35.17
30	0.5	5.39	8.70	21.85	30.38	39.86	45.45
60	1	6.58	10.60	26.45	36.92	48.76	55.81
120	2	11.50	16.25	34.79	46.50	59.59	67.62
180	3	14.42	19.56	39.49	51.92	65.87	74.56
240	4	16.41	21.80	42.63	55.54	70.15	79.36
360	6	18.97	24.66	46.63	60.14	75.70	85.78
540	9	21.19	27.14	50.08	64.19	80.60	91.68
720	12	22.61	28.73	52.28	66.79	83.77	95.53
900	15	23.61	29.86	53.87	68.63	86.09	98.30
1080	18	24.41	30.76	55.13	70.10	87.90	100.47
1440	24	25.71	32.20	57.10	72.44	90.63	103.72
1800	30	26.79	33.40	58.75	74.35	92.85	106.15
2160	36	27.74	34.47	60.23	76.06	94.83	108.23
2880	48	29.48	36.41	62.94	79.15	98.36	111.79

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
3600	**60**	31.13	38.27	65.57	82.16	101.66	115.04
4320	**72**	32.70	40.05	68.11	85.06	104.80	118.10
5040	**84**	34.24	41.80	70.61	87.91	107.84	121.04
5760	**96**	35.77	43.54	73.10	90.73	110.83	123.92

Surface water storage volume design tool

www.uksuds.com | Surface water storage volume design tool (https://www.uksuds.com/)

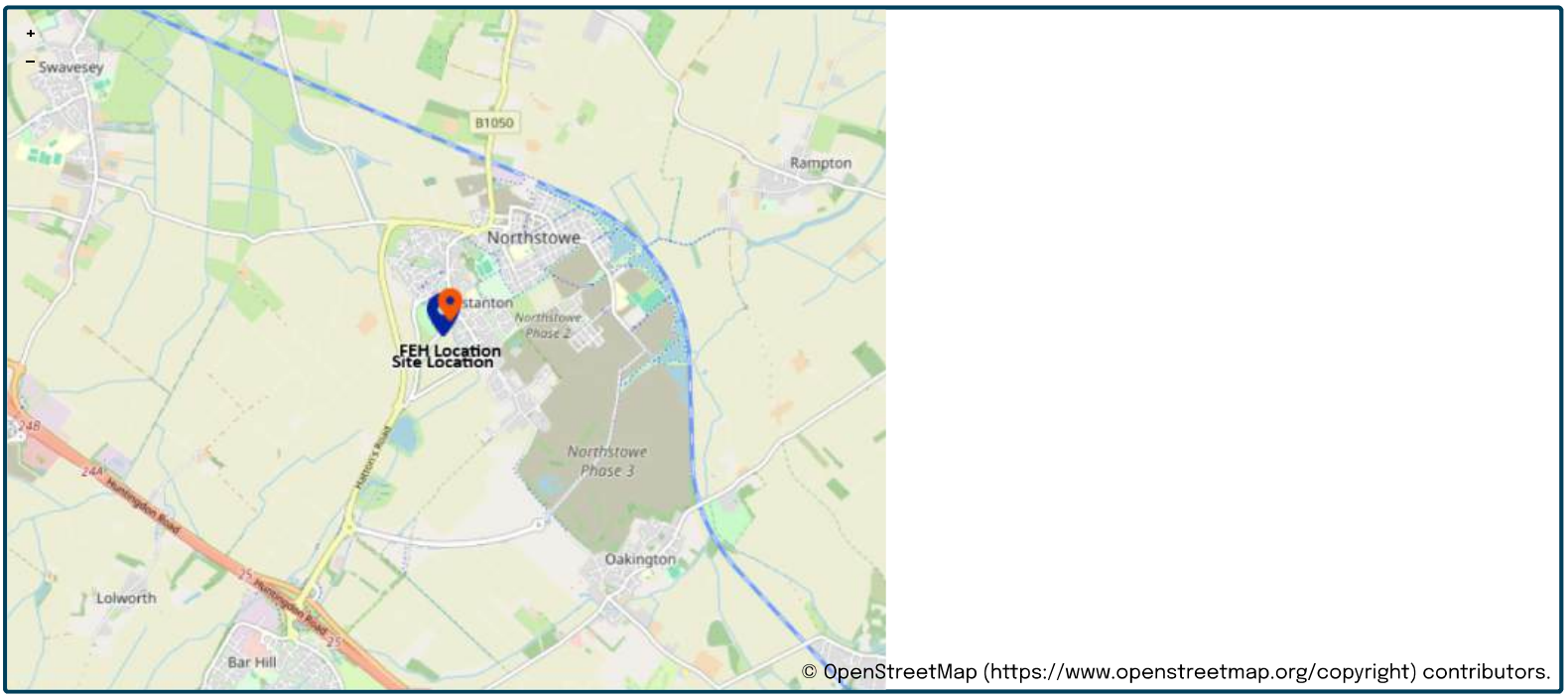
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	18/09/2026
Calculated by	JFS
Reference	1019.5022
Model version	2.2.3

Location

Site name	Catchment 3
Site location	Hattons Rd, Longstanton



Site easting (British National Grid)	539507
Site northing (British National Grid)	266355

Site areas

Total site area (ha)	4.058	ha

Roof area

Total roof area (ha)	1.68	ha
Contributing roof area (ha)	1.68	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.72	ha
Contributing paved area (ha)	0.72	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	1.658	ha
Contributing grass / vegetated area (ha)	1.658	ha
Non-contributing grass / vegetated area (ha)	0	ha

Total area

Total contributing area (ha)	4.058	ha

Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	3:1	
Storage design depth (m)	0.9	m
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	