

Flood Risk Assessment

ALBRIGHTON SOUTH

BONINGALE HOMES LIMITED

04/07/2024



FLOOD RISK ASSESSMENT
ALBRIGHTON SOUTH
FOR
BONINGALE HOMES LIMITED



48842-ECE-XX-XX-RP-C-0003

04 July 2024

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<i>Issue 1</i>	<i>12 April 2024</i>	
<i>Issue 2</i>	<i>04 July 2024</i>	<i>Updated drainage strategy included.</i>

EXECUTIVE SUMMARY

The project comprises the proposed development of an approximately 47-hectare greenfield site for residential use. For the purpose of this report, the site is split into Zone A (west) and Zone B (east).

The Environment Agency's Flood Map for Planning shows the site to lie within Flood Zone 1. The site is not at significant risk of flooding from any source. In accordance with current Planning Practice Guidance 'Flood Risk and Coastal Change', sequential testing is not required.

There is a low risk and a low to high risk surface water flow route in the west and east of Zone A respectively. The western flow route leads towards an unnamed watercourse originating south of the site with an area of low to high risk ponding on the southern boundary of the site. The eastern flow route corresponds with the route (and surrounding area) of the unnamed watercourse in this part of the site. There are two areas at low to high risk of surface water ponding in Zone B which are the result of localised topographic depressions in proximity to existing field ditches. There is an additional smaller area at low to medium risk of surface water ponding in Zone B corresponding with the location of an existing pond feature with an outfall.

The western flow route in Zone A should be maintained or routed around proposed buildings towards the existing watercourse south of the site. The eastern flow route in Zone A of the site should be maintained as it corresponds with the location of an existing watercourse and surrounding area. Layout adjustments and re-profiling of the ground may be required to ensure that the flow route is preserved. Open space should be developed around the watercourse to ensure that existing flow capacity is not impeded.

Ground levels will need to be raised if development is proposed where topographic depressions and surface water ponding is present (Zone B). Layout adjustments and ground reprofiling will therefore be needed to ensure that flood storage is available to accommodate any existing surface water ponding on site that may occur from the nearby field ditches and ensure that flood water is not pushed onto third party land. The reprofiling of site levels and presence of the site's surface water drainage infrastructure will remove any surface water ponding within the development area and will lower the modelled flood depth. The existing pond feature with an outfall in the centre of Zone B will need to be maintained. Building FFLs will be raised above external levels and the site should be laid out so that vulnerable development is not located within areas at risk of surface water flooding.

Surface water from Zone A will discharge via a pumped system to the unnamed watercourse within its eastern boundary. Surface water disposal in Zone B will be to unnamed watercourses located to the south-east and north-west of the site (a pumped system may be required subject to confirmation of watercourse levels). All proposed connections to existing watercourses are subject to approval from the Lead Local Flood Authority and ordinary watercourse consent will be required.

Zones A and B have each been split into four smaller parcels for the purpose of draining the site, resulting in a total of eight drainage parcels. Surface water discharge for each parcel will likely be restricted to 1.4 l/s/ha for the development area, or 3.5 l/s as a minimum practical rate if the rate is lower than this. The total surface water discharge rate equates to 17.7 l/s and 19.7 l/s for Zones A and Zone B respectively, subject to approval from the Lead Local Flood Authority.

Attenuation storage will be provided in a basin/ tank within each of the smaller drainage parcels for rainfall events up to the return period of 1 in 100 year plus 40% climate change. The total estimated storage volumes for Zone A and Zone B are approximately 12,740 m³ and 14,200 m³ respectively, subject to detailed design.

SuDS features such as basins, swales, permeable paving (Type C) and rain gardens may be suitable (depending on site conditions) to incorporate into the site to provide water treatment and attenuation as well as biodiversity and amenity value. The suitability of different SuDS features is subject to site conditions and detailed design.

Foul effluent will discharge via gravity to the site low points in Zone A and B, before being pumped to the 150 mm public combined sewer in Cross Road north of the site, subject to approval from Severn Trent Water. Severn Trent Water state that additional investigations/ modelling will be required to better understand the impact of the additional properties on the public sewer network.

Both the surface and foul water drainage systems will be offered for adoption to Severn Trent Water.

1.0 THE DEVELOPMENT AND NATIONAL PLANNING POLICY

1.1 Introduction

This Flood Risk Assessment has been prepared in accordance with current National Planning Policy Framework¹ and Planning Practice Guidance 'Flood Risk and Coastal Change'² on the instruction of Boningale Homes Limited. Any other parties using the information in this report do so at their own risk, unless previously approved in writing. This report only outlines a general drainage strategy for the proposed development. The drainage strategy is set out in the site-specific Drainage Assessment Report (48842-ECE-XX-XX-RP-C-0004) and associated plans from which all necessary drainage references should be made.

The project comprises the proposed development of an approximately 47-hectare greenfield site for residential use.

1.2 Site location and description

The site is located within Albrighton, to the north-west of Wolverhampton, and is centred on coordinates 380707E, 303359N (Appendix 1).

The site is separated into two areas referenced as Zone A (west) and Zone B (east), both bounded by Cross Road to the north and Holyhead Road to the south. Patshull Road and residential properties are located between Zone A and Zone B. Zone B is also bounded by Newhouse Lane to the east.

The site is currently occupied by open farmland boarded by mature trees and hedgerows.

Zone A falls from approximately 98.49 mAOD in the west to 92.88 mAOD in the south, 90.97 mAOD in the south-east and 91.12 mAOD in the east at average gradients of 1 in 46, 1 in 63 and 1 in 88, respectively. Zone B falls from approximately 94.38 mAOD in the north-east to approximately 91.85 mAOD in the west and 87.13 mAOD in the south at average gradients of 1 in 200 and 1 in 92, respectively (Appendix 2).

Proposals are for the development of residential properties, a school, care home and local centre (Appendix 3).

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

1.3 Environment Agency - Flood Map for Planning

The Environment Agency's Flood Map for Planning (Figure 1 and Appendix 4) shows that the site lies within Zone 1 (low risk); land having a less than 1 in 1,000 annual probability of flooding from rivers or sea.

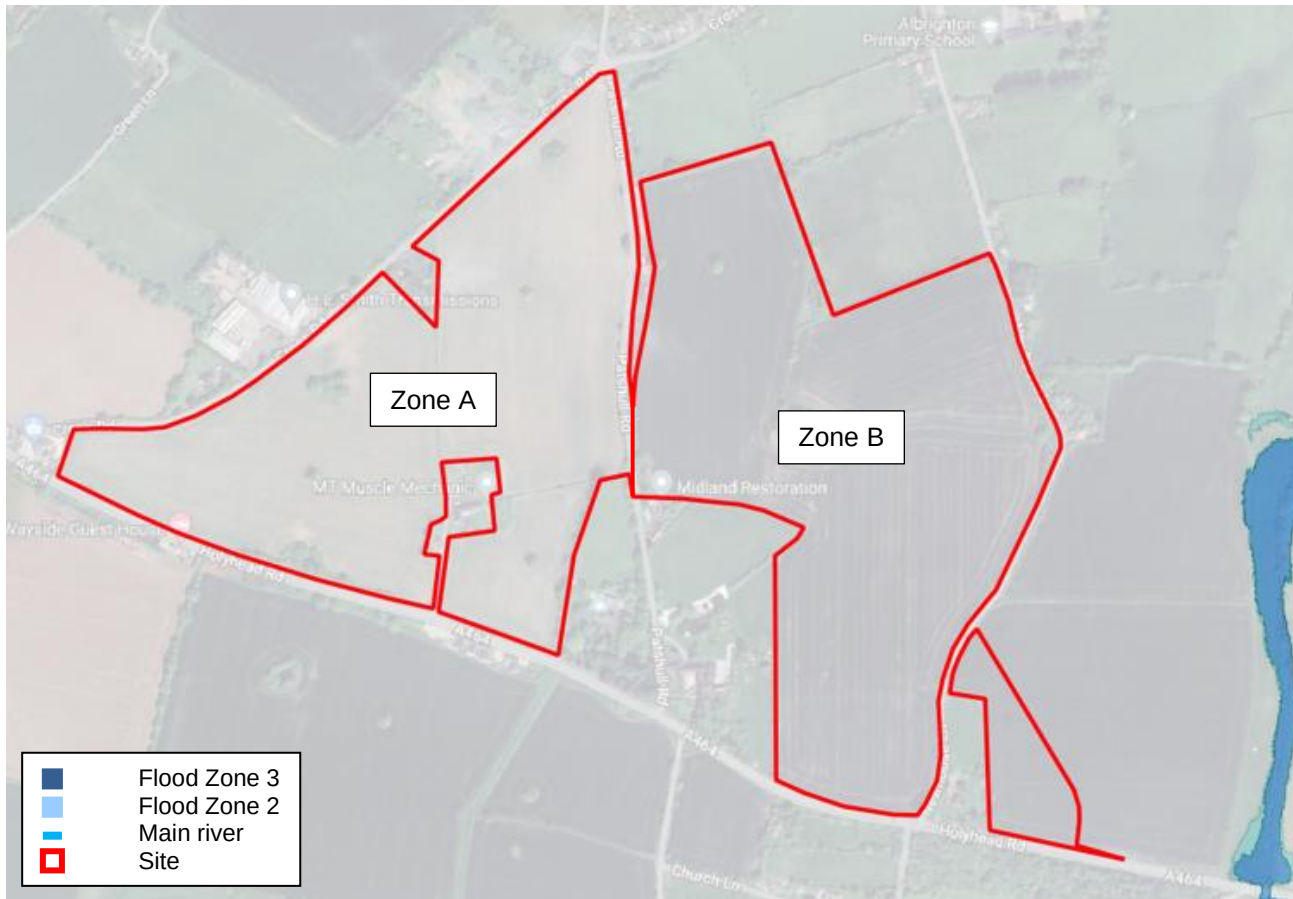


Figure 1: Environment Agency's Flood Map for Planning

1.4 South Staffordshire Council Flood Map

South Staffordshire Council's flood map is based on the Environment Agency flood map and records the site to be within Flood Zone 1 (Appendix 5).

1.5 National Planning Policy Framework

The National Planning Policy Framework (December 2023) sets out the principles for assessing the suitability of sites for development, in relation to flood risk, as part of the planning process.

1.5.1 Sequential Test

Initially a Sequential Test is applied to the allocation of land suitable for development. The test is required for any development proposed in Flood Zone 2 or 3 (and occasionally also in Flood Zone 1 where there are flood risks present which are not identified on the Environment Agency's Flood Maps for Planning).

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development, in areas with a lower probability of flooding.

The site lies within Flood Zone 1 and this report confirms that the site is not at significant risk of potential flooding from any source, therefore the sequential test is not required.

1.5.2 Climate change

An issue emphasised in the Planning Policy Guidance is the requirement to take account of potential climate change effects. New development is generally accepted as having a 100 year design life for flood risk purposes. Climate change allowances for peak rainfall intensity³ are to be selected based on the assigned values for the relevant Management Catchment and epoch suited to the design life of the development. For the Severn Middle Worcestershire Management Catchment the Upper End Allowance of 40% should be used to assess storage requirements.

³ <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>

2.0 FLOOD RISK

2.1 Potential sources of flooding

The Environment Agency and Strategic Flood Risk Assessment maps are intended for general guidance on flood risk and it is also necessary to consider other, more detailed, sources in relation to local factors.

2.1.1 Fluvial and tidal

The nearest watercourse is an unnamed watercourse located within the eastern portion of Zone A flowing in a southern direction. Additional unnamed watercourses are also located 230 m south-east of Zone B and 330 m south-west of Zone A. There are also field ditches located to the north-east of Zone B. These watercourses connect into a wider drainage network south of the site and are not tidally influenced, therefore flood risk from these sources is assessed as negligible.

2.1.2 Surface water

The Environment Agency surface water flood risk map (Figure 2 and Appendix 4) shows the majority of the site to be at very low risk of surface water flooding. Very low risk corresponds to the unshaded areas of the map. There is a low risk and a low to high risk surface water flow route in the west and east of Zone A respectively. The western flow route leads towards an unnamed watercourse originating south of the site with an area of low to high risk ponding on the southern boundary of the site. The eastern flow route corresponds with the route (and surrounding area) of the unnamed watercourse in this part of the site. There are two areas at low to high risk of surface water ponding in Zone B which are the result of localised topographic depressions in proximity to existing field ditches. There is an additional smaller area at low to medium risk of surface water ponding in Zone B corresponding with the location of an existing pond feature with an outfall.

Very low risk refers to land having less than a 1 in 1,000 annual exceedance probability of flooding (0.1% AEP). Low risk refers to land having between a 1 in 1,000 and 1 in 100 annual exceedance probability of flooding (0.1% - 1% AEP). Medium risk refers to land having between a 1 in 100 and 1 in 30 annual exceedance probability of flooding (1% - 3.33% AEP).

Surface water ponding depths for extreme rainfall events between the 1 in 100 and 1 in 1000 year return period generally range from 0 - 900 mm, while depths for the western flow route in the Zone A parcel of the site are below 300 mm (Appendix 4).



Figure 2: Environment Agency – Risk of surface water flooding map

2.1.3 Reservoir

The Environment Agency reservoir flood risk map (Figure 3 and Appendix 4) shows the whole site to lie outside of the maximum extent of flooding from reservoirs, even when there is flooding from rivers.

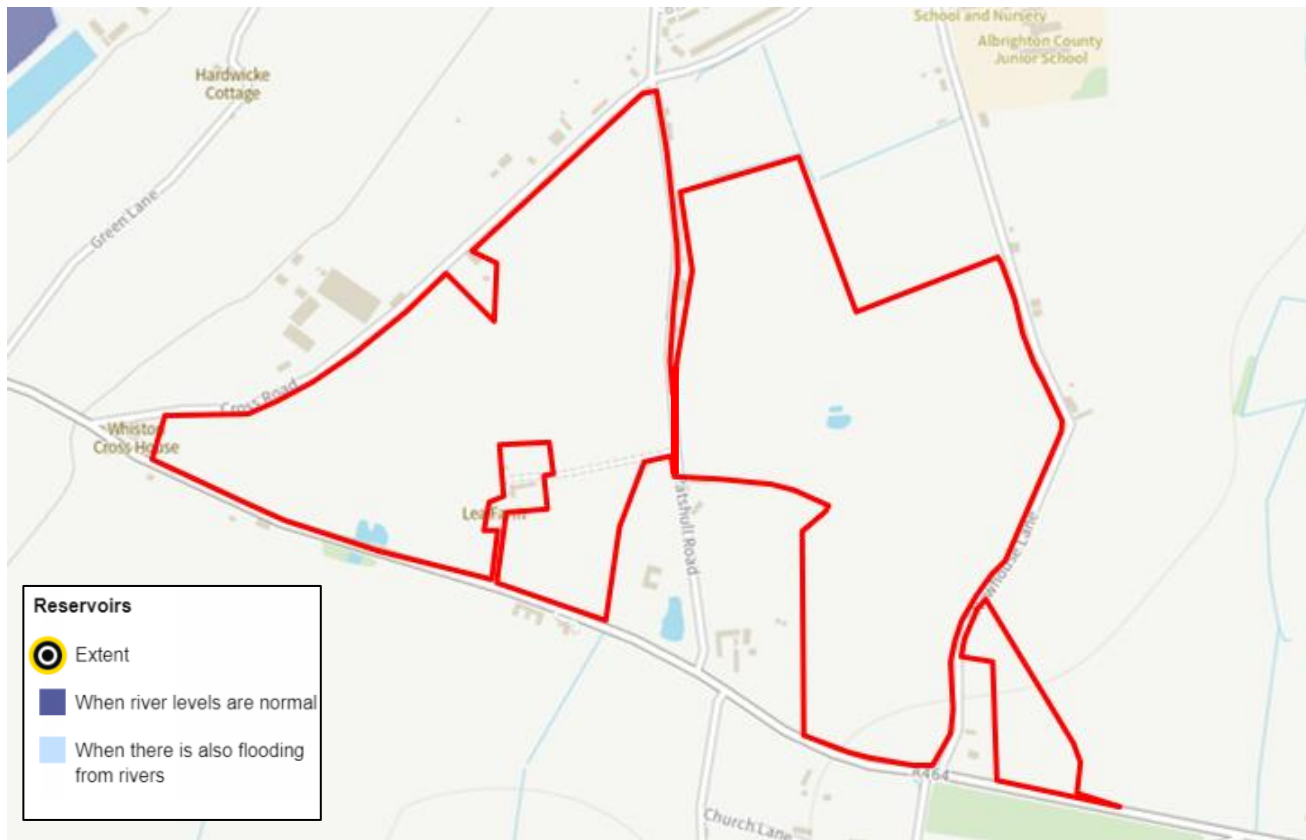


Figure 3: Environment Agency – Risk of reservoir flooding map

2.1.4 Groundwater

Groundwater is a potential flood risk to areas which are low lying and on permeable ground or, occasionally, to areas of higher ground in the vicinity of springs. There is no public record of any flood risk to the site associated with groundwater.

2.1.5 Sewerage

The surrounding public sewer network is owned and maintained by Severn Trent Water. There is no public record of any flood risk to the site associated with these sewers.

2.2 Historic Flooding

The Rivers Trust historical flood map (Appendix 7) records the site to be outside the historical flood outline.

2.3 Residual flood risk

There is a low risk and a low to high risk surface water flow route in the west and east of Zone A respectively. The western flow route leads towards an unnamed watercourse originating south of the site with an area of low to high risk ponding on the southern boundary of the site. The eastern flow route corresponds with the route (and surrounding area) of the unnamed watercourse in this part of the site. There are two areas at low to high risk of surface water ponding in Zone B which are the result of localised topographic depressions in proximity to existing field ditches. There is an additional smaller area at low to medium risk of surface water ponding in Zone B corresponding with the location of an existing pond feature with an outfall.

These risks are not a development constraint and will be managed on the site within the surface water drainage strategy and by the mitigation measures in Section 2.4.

2.4 Flood Mitigation Measures

The western flow route in Zone A should be maintained or routed around proposed buildings towards the existing watercourse south of the site. The eastern flow route in Zone A of the site should be maintained as it corresponds with the location of an existing watercourse and surrounding area. Layout adjustments and re-profiling of the ground may be required to ensure that the flow route is preserved. Open space should be developed around the watercourse to ensure that existing flow capacity is not impeded.

Ground levels will need to be raised if development is proposed where topographic depressions and surface water ponding is present (Zone B). Layout adjustments and ground reprofiling will therefore be needed to ensure that flood storage is available to accommodate any existing surface water ponding on site that may occur from the nearby field ditches and ensure that flood water is not pushed onto third party land. The reprofiling of site levels and presence of the site's surface water drainage infrastructure will remove any surface water ponding within the development area and will lower the modelled flood depth. The existing pond feature with an outfall in the centre of Zone B will need to be maintained.

Building FFLs will be raised above external levels and the site should be laid out so that vulnerable development is not located within areas at risk of surface water flooding.

3.0 DRAINAGE STRATEGY

Detailing of the drainage strategy is provided within a separate site specific Drainage Assessment Report (48842-ECE-XX-XX-RP-C-0004) and associated plans. A summary of the proposed drainage strategy is noted below.

3.1 Proposals for surface water disposal

The final disposal strategy for surface water run-off requires detailed consideration and approval during the design phase of the project. The final design will need the approval of the relevant statutory bodies but will broadly follow these principles:

- It is not expected that soakaway drainage will be viable due to the expected cohesive ground conditions (48842-ECE-XX-XX-RP-C-0001).
- Surface water from Zone A will discharge via a pumped system to the unnamed watercourse within its eastern boundary. Surface water disposal in Zone B will be to unnamed watercourses located to the south-east and north-west of the site (a pumped system may be required subject to confirmation of watercourse levels). All proposed connections to existing watercourses are subject to approval from the Lead Local Flood Authority and ordinary watercourse consent will be required.
- Zones A and B have both been split into four smaller parcels for the purpose of draining the site, resulting in a total of eight drainage parcels. Surface water discharge for each parcel will likely be restricted to 1.4 l/s/ha for the development area, or 3.5 l/s as a minimum practical rate if the rate is lower than this. The total surface water discharge rate equates to 17.7 l/s and 19.7 l/s for Zones A and Zone B respectively, subject to approval from the Lead Local Flood Authority.
- Attenuation storage will be provided in a basin/ tank within each of the smaller drainage parcels for rainfall events up to the return period of 1 in 100 year plus 40% climate change. The total estimated storage volumes for Zone A and Zone B are approximately 12,740 m³ and 14,200 m³ respectively, subject to detailed design.
- SuDS features such as basins, swales, permeable paving (Type C) and rain gardens may be suitable (depending on site conditions) to incorporate into the site to provide water treatment

and attenuation as well as biodiversity and amenity value. The suitability of different SuDS features is subject to site conditions and detailed design.

- The surface water drainage system will be offered for adoption to Severn Trent Water.

3.2 Proposals for foul disposal

Foul effluent will discharge via gravity to the site low points in Zone A and B, before being pumped to the 150 mm public combined sewer in Cross Road north of the site, subject to approval from Severn Trent Water.

Severn Trent Water state that additional investigations/ modelling will be required to better understand the impact of the additional properties on the public sewer network (Appendix 6).

The foul drainage system will be offered for adoption to Severn Trent Water.

3.3 Residual flood risk

There is a potential flood risk to site occupiers and to others from surface water runoff as a result of developing the site. The residual risk can be managed by the general flood mitigation measures outlined in Section 3.4.

3.4 Mitigation measures

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication 'Design and Construction Guidance for foul and surface water sewers' and Building Regulations Part H 2015.

In the event of surface water exceedance during extreme rainfall events the site is laid out so that surface water runoff is directed away from buildings, including those on neighbouring streets.

4.0 CONCLUSIONS

1. The site is within Flood Zone 1 and is not at significant risk of fluvial flooding.
2. There is a low risk and a low to high risk surface water flow route in the west and east of Zone A respectively. The western flow route leads towards an unnamed watercourse originating south of the site with an area of low to high risk ponding on the southern boundary of the site. The eastern flow route corresponds with the route (and surrounding area) of the unnamed watercourse in this part of the site. There are two areas at low to high risk of surface water ponding in Zone B which are the result of localised topographic depressions in proximity to existing field ditches. There is an additional smaller area at low to medium risk of surface water ponding in Zone B corresponding with the location of an existing pond feature with an outfall.
3. The western flow route in Zone A should be maintained or routed around proposed buildings towards the existing watercourse south of the site. The eastern flow route in Zone A of the site should be maintained as it corresponds with the location of an existing watercourse and surrounding area. Layout adjustments and re-profiling of the ground may be required to ensure that the flow route is preserved. Open space should be developed around the watercourse to ensure that existing flow capacity is not impeded.
4. Ground levels will need to be raised if development is proposed where topographic depressions and surface water ponding is present (Zone B). Layout adjustments and ground reprofiling will therefore be needed to ensure that flood storage is available to accommodate any existing surface water ponding on site that may occur from the nearby field ditches and ensure that flood water is not pushed onto third party land. The reprofiling of site levels and presence of the site's surface water drainage infrastructure will remove any surface water ponding within the development area and will lower the modelled flood depth. The existing pond feature with an outfall in the centre of Zone B will need to be maintained.
5. Building FFLs will be raised above external levels and the site should be laid out so that vulnerable development is not located within areas at risk of surface water flooding.

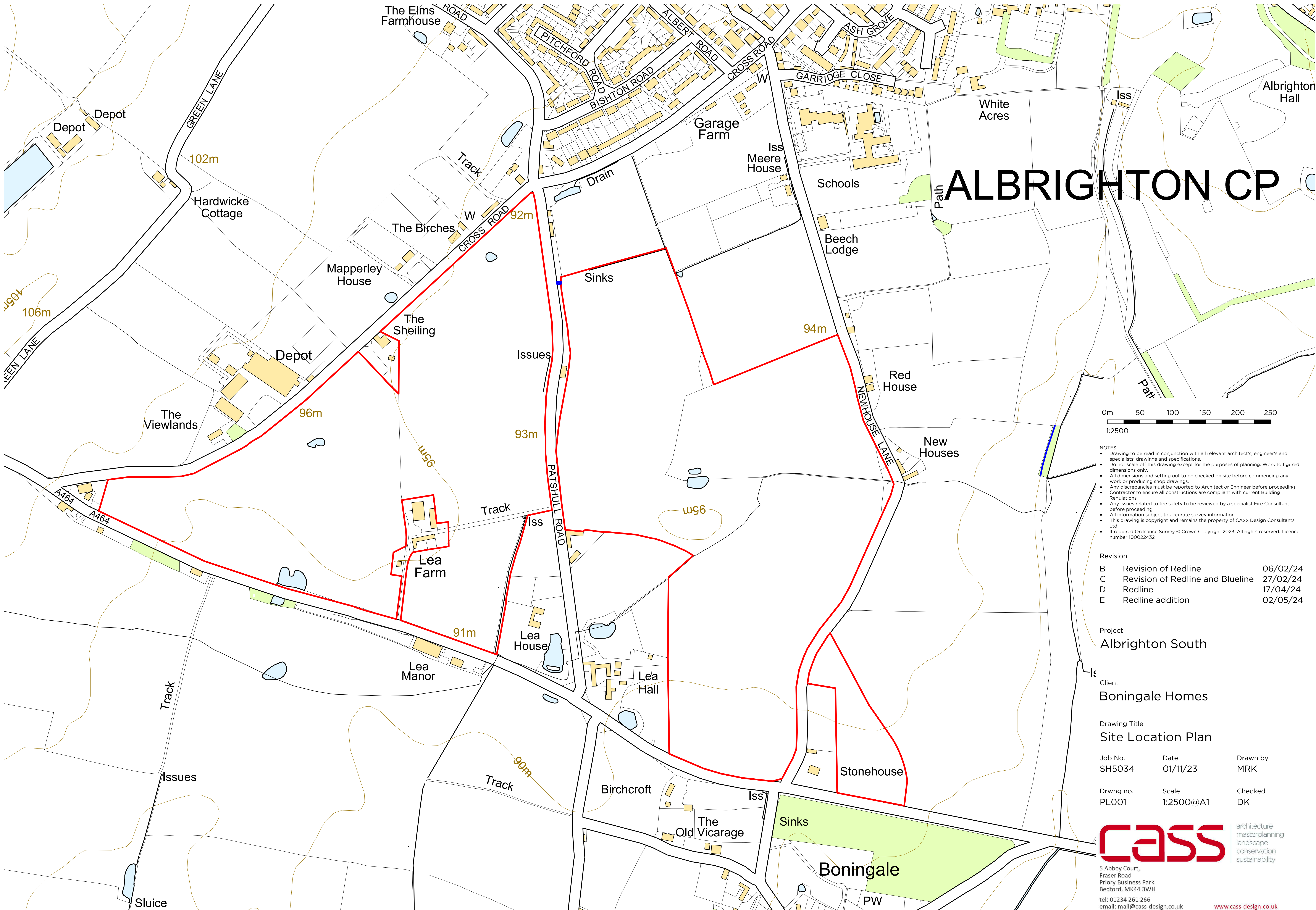
Surface water from Zone A will discharge via a pumped system to the unnamed watercourse within its eastern boundary. Surface water disposal in Zone B will be to unnamed watercourses located to the south-east and north-west of the site (a pumped system may be required subject to confirmation of watercourse levels). All proposed connections to existing watercourses are subject

to approval from the Lead Local Flood Authority and ordinary watercourse consent will be required.

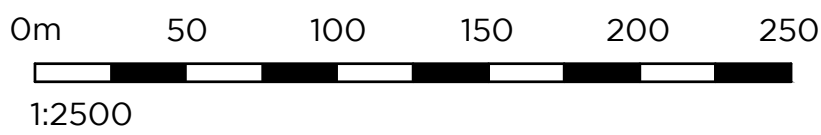
6. Zones A and B have been split into four smaller parcels for the purpose of draining the site, resulting in a total of eight drainage parcels. Surface water discharge for each parcel will likely be restricted to 1.4 l/s/ha for the development area, or 3.5 l/s as a minimum practical rate if the rate is lower than this. The total surface water discharge rate equates to 17.7 l/s and 19.7 l/s for Zones A and Zone B respectively, subject to approval from the Lead Local Flood Authority.
7. Attenuation storage will be provided in a basin/ tank within each of the smaller drainage parcels for rainfall events up to the return period of 1 in 100 year plus 40% climate change. The total estimated storage volumes for Zone A and Zone B are approximately 12,740 m³ and 14,200 m³ respectively, subject to detailed design.
8. SuDS features such as basins, swales, permeable paving (Type C) and rain gardens may be suitable (depending on site conditions) to incorporate into the site to provide water treatment and attenuation as well as biodiversity and amenity value. The suitability of different SuDS features is subject to site conditions and detailed design.
9. Foul effluent will discharge via gravity to the site low points in Zone A and B, before being pumped to the 150 mm public combined sewer in Cross Road north of the site, subject to approval from Severn Trent Water. Severn Trent Water state that additional investigations/ modelling will be required to better understand the impact of the additional properties on the public sewer network.
10. Both the surface and foul water drainage systems will be offered for adoption to Severn Trent Water.
11. The level of risk and safeguards available are considered appropriate to this class of development.

APPENDICES

APPENDIX 1



ALBRIGHTON CP



- NOTES
- Drawing to be read in conjunction with all relevant architect's, engineer's and specialists' drawings and specifications.
 - Do not scale off this drawing except for the purposes of planning. Work to figured dimensions only.
 - All dimensions and setting out to be checked on site before commencing any work or producing shop drawings.
 - Any discrepancies must be reported to Architect or Engineer before proceeding
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 - Any issues related to fire safety to be reviewed by a specialist Fire Consultant before proceeding
 - All information subject to accurate survey information
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Revision		
B	Revision of Redline	06/02/24
C	Revision of Redline and Blueline	27/02/24
D	Redline	17/04/24
E	Redline addition	02/05/24

Project
Albrighton South

Client
Boningale Homes

Drawing Title
Site Location Plan

Job No.	Date	Drawn by
SH5034	01/11/23	MRK

Drwng no.	Scale	Checked
PL001	1:2500@A1	DK



architecture
masterplanning
landscape
conservation
sustainability

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APPENDIX 2



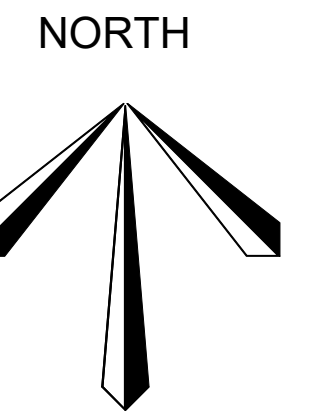
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GENERAL NOTES >
ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
SERVICE COVERS INDICATED WHERE VISIBLE.
PIPE INVERTS / DETAILS SURVEYED FROM SURFACE.
GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED
BURIED SERVICE COVERS WILL NOT BE INDICATED.
SERVICE COVERS LOCATED UNDER IMMOVABLE OBJECTS MAY BE OMITTED
THREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.
OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE
SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROXIMATE.

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SURVEY STATIONS			
Label	Easting	Northing	Height
PCP3	380719.502	303229.278	90.080





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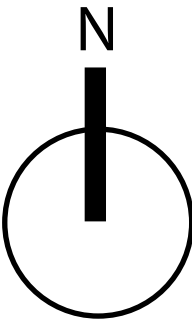
GENERAL NOTES:

- ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.
- SERVICE CONTOURS INDICATED WHERE USABLE.
- PIPE INVERTS: DETAILS SUPPLIED FROM SURFACE.
- GENERAL CONTOUR COVERS AND COVERING WITHIN HIGHWAYS WILL NOT BE LIFTED.
- REMOVED SERVICE CONTOURS WILL NOT BE INDICATED.
- SERVICE CONTOURS LOCATED UNDER IMMOVABLE OBJECTS MAY BE OMITTED.
- THESE SPICES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.
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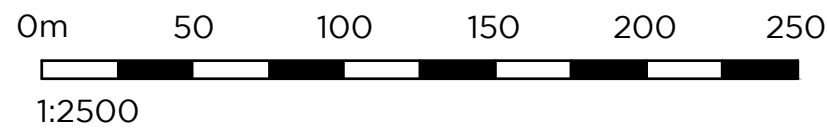
KEY - GENERAL

AC	Access	KB	Kerb Line
AD	Air Valve	KD	Kerb Drain
BA	Barbed Wire	LT	Line of Trees
BD	Bollard	LP	Lamp Post
BM	Bench Mark	MA	Manhole
BN	Bench Mark	MB	Manhole Box
CA	Channel	MC	Manhole Cover
CB	Channel	MD	Manhole Drain
CC	Channel	ME	Manhole Edge
CD	Channel	MF	Manhole Foot
CE	Channel	MG	Manhole Gully
CF	Channel	MH	Manhole Head
CG	Channel	MI	Manhole Inlet
CH	Channel	MJ	Manhole Joint
CI	Channel	MK	Manhole Key
CJ	Channel	ML	Manhole Lining
CK	Channel	MM	Manhole Manhole
CL	Channel	MN	Manhole Neck
CM	Channel	MO	Manhole Opening
CN	Channel	MP	Manhole Pipe
CO	Channel	MQ	Manhole Plug
CP	Channel	MR	Manhole Riser
CQ	Channel	MS	Manhole Sill
CR	Channel	MT	Manhole Stop
CS	Channel	MU	Manhole Trench
CT	Channel	MV	Manhole Wall
CU	Channel	MW	Manhole Water
CV	Channel	MX	Manhole Wind
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CB	Channel	MZ	Manhole Zinc
CC	Channel	NA	Manhole Zinc
CD	Channel	NB	Manhole Zinc
CE	Channel	NC	Manhole Zinc
CF	Channel	ND	Manhole Zinc
CG	Channel	NE	Manhole Zinc
CH	Channel	NF	Manhole Zinc
CI	Channel	NG	Manhole Zinc
CJ	Channel	NH	Manhole Zinc
CK	Channel	NI	Manhole Zinc
CL	Channel	NJ	Manhole Zinc
CM	Channel	NK	Manhole Zinc
CN	Channel	NL	Manhole Zinc
CO	Channel	NM	Manhole Zinc
CP	Channel	NO	Manhole Zinc
CQ	Channel	NP	Manhole Zinc
CR	Channel	NQ	Manhole Zinc
CS	Channel	NR	Manhole Zinc
CT	Channel	NS	Manhole Zinc
CU	Channel	NT	Manhole Zinc
CV	Channel	NU	Manhole Zinc
CA	Channel	NV	Manhole Zinc
CB	Channel	NW	Manhole Zinc
CC	Channel	NX	Manhole Zinc
CD	Channel	NY	Manhole Zinc
CE	Channel	NZ	Manhole Zinc
CF	Channel	OA	Manhole Zinc
CG	Channel	OB	Manhole Zinc
CH	Channel	OC	Manhole Zinc
CI	Channel	OD	Manhole Zinc
CJ	Channel	OE	Manhole Zinc
CK	Channel	OF	Manhole Zinc
CL	Channel	OG	Manhole Zinc
CM	Channel	OH	Manhole Zinc
CN	Channel	OI	Manhole Zinc
CO	Channel	OJ	Manhole Zinc
CP	Channel	OK	Manhole Zinc
CQ	Channel	OL	Manhole Zinc
CR	Channel	OM	Manhole Zinc
CS	Channel	ON	Manhole Zinc
CT	Channel	OO	Manhole Zinc
CU	Channel	OP	Manhole Zinc
CV	Channel	OQ	Manhole Zinc
CA	Channel	OR	Manhole Zinc
CB	Channel	OS	Manhole Zinc
CC	Channel	OT	Manhole Zinc
CD	Channel	OU	Manhole Zinc
CE	Channel	OV	Manhole Zinc
CF	Channel	OW	Manhole Zinc
CG	Channel	OX	Manhole Zinc
CH	Channel	OY	Manhole Zinc
CI	Channel	OZ	Manhole Zinc
CJ	Channel	PA	Manhole Zinc
CK	Channel	PB	Manhole Zinc
CL	Channel	PC	Manhole Zinc
CM	Channel	PD	Manhole Zinc
CN	Channel	PE	Manhole Zinc
CO	Channel	PF	Manhole Zinc
CP	Channel	PG	Manhole Zinc
CQ	Channel	PH	Manhole Zinc
CR	Channel	PI	Manhole Zinc
CS	Channel	PJ	Manhole Zinc
CT	Channel	PK	Manhole Zinc
CU	Channel	PL	Manhole Zinc
CV	Channel	PM	Manhole Zinc
CA	Channel	PN	Manhole Zinc
CB	Channel	PO	Manhole Zinc
CC	Channel	PP	Manhole Zinc
CD	Channel	PQ	Manhole Zinc
CE	Channel	PR	Manhole Zinc
CF	Channel	PS	Manhole Zinc
CG	Channel	PT	Manhole Zinc
CH	Channel	PU	Manhole Zinc
CI	Channel	PV	Manhole Zinc
CJ	Channel	PW	Manhole Zinc
CK	Channel	PX	Manhole Zinc
CL	Channel	PY	Manhole Zinc
CM	Channel	PZ	Manhole Zinc
CN	Channel	QA	Manhole Zinc
CO	Channel	QB	Manhole Zinc
CP	Channel	QC	Manhole Zinc
CQ	Channel	QD	Manhole Zinc
CR	Channel	QE	Manhole Zinc
CS	Channel	QF	Manhole Zinc
CT	Channel	QG	Manhole Zinc
CU	Channel	QH	Manhole Zinc
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CA	Channel	QJ	Manhole Zinc
CB	Channel	QK	Manhole Zinc
CC	Channel	QL	Manhole Zinc
CD	Channel	QM	Manhole Zinc
CE	Channel	QN	Manhole Zinc
CF	Channel	QO	Manhole Zinc
CG	Channel	QP	Manhole Zinc
CH	Channel	QQ	Manhole Zinc
CI	Channel	QR	Manhole Zinc
CJ	Channel	QS	Manhole Zinc
CK	Channel	QT	Manhole Zinc
CL	Channel	QU	Manhole Zinc
CM	Channel	QV	Manhole Zinc
CN	Channel	QW	Manhole Zinc
CO	Channel	QX	Manhole Zinc
CP	Channel	QY	Manhole Zinc
CQ	Channel	QZ	Manhole Zinc
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CS	Channel	RB	Manhole Zinc
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CU	Channel	RD	Manhole Zinc
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CM	Channel	RS	Manhole Zinc
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CO	Channel	RU	Manhole Zinc
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CQ	Channel	RW	Manhole Zinc
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CI	Channel	SK	Manhole Zinc
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CQ	Channel	SS	Manhole Zinc
CR	Channel	ST	Manhole Zinc
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CN	Channel	TL	Manhole Zinc
CO	Channel	TM	Manhole Zinc
CP	Channel	TN	Manhole Zinc
CQ	Channel	TO	Manhole Zinc
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CL	Channel	TV	Manhole Zinc
CM	Channel	TV	Manhole Zinc
CN	Channel	TV	Manhole Zinc
CO	Channel	TV	Manhole Zinc
CP	Channel	TV	Manhole Zinc
CQ	Channel	TV	Manhole

APPENDIX 3



- Key
- Blocks
 - Rear Gardens
 - Road
 - Shared Surface
 - Public Open Space
 - Green Infrastructure
 - SUDS Infrastructure/Ponds
 - Existing Trees
 - Existing Vegetation
 - Existing Hedgerows
 - Proposed Trees
 - Local Play Areas (LAP)
 - Existing Ponds
 - Existing Public Right of Way
 - Proposed Pedestrian Links



Project
Albrighton South
Client
Boningle Homes

Drawing Title
Framework Plan

Job No.	Date	Drawn by
SH5034	21/05/24	MRK

Drwng no.	Scale	Checked
SK003	1:2500@A1	DK



5 Abbey Court
Fraser Road
Bedford MK44 3WH
t: 01234 261 266
e: mail@cass-design.co.uk

cass-design.co.uk

APPENDIX 4

Flood map for planning

Your reference
Albrighton So

Location (easting/northing)
380625/303258

Created
9 Apr 2024 10:05

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

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

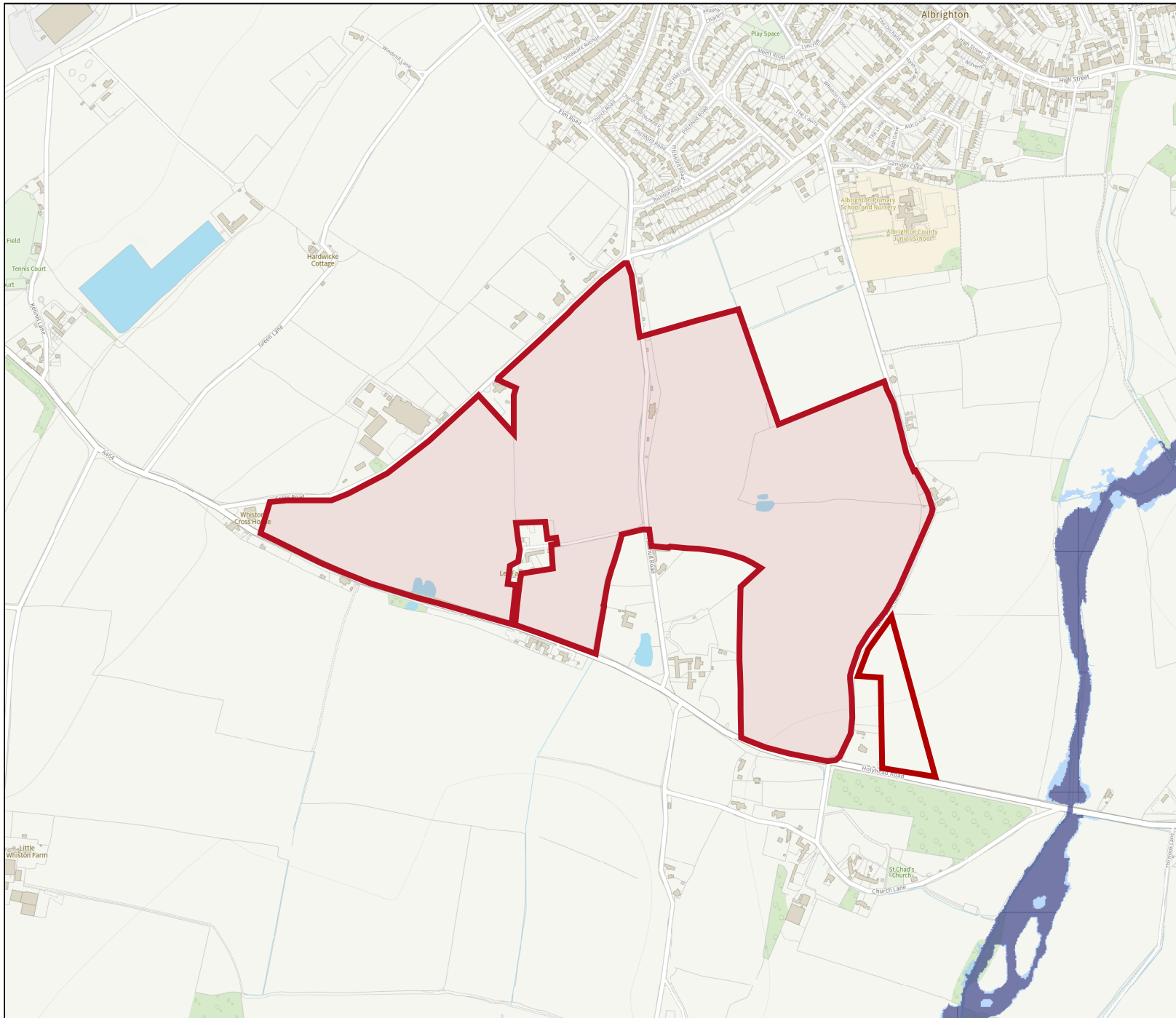
Notes

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.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

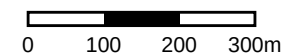
Your reference
Albrighton So

Location (easting/northing)
380625/303258

Scale
1:10000

Created
9 Apr 2024 10:05

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area





Environment Agency Flood Map for Planning



Environment Agency - Surface Water Flood Risk Map



Environment Agency - Surface Water Flood Depth Map - High Risk



Environment Agency - Surface Water Flood Depth Map - Low Risk



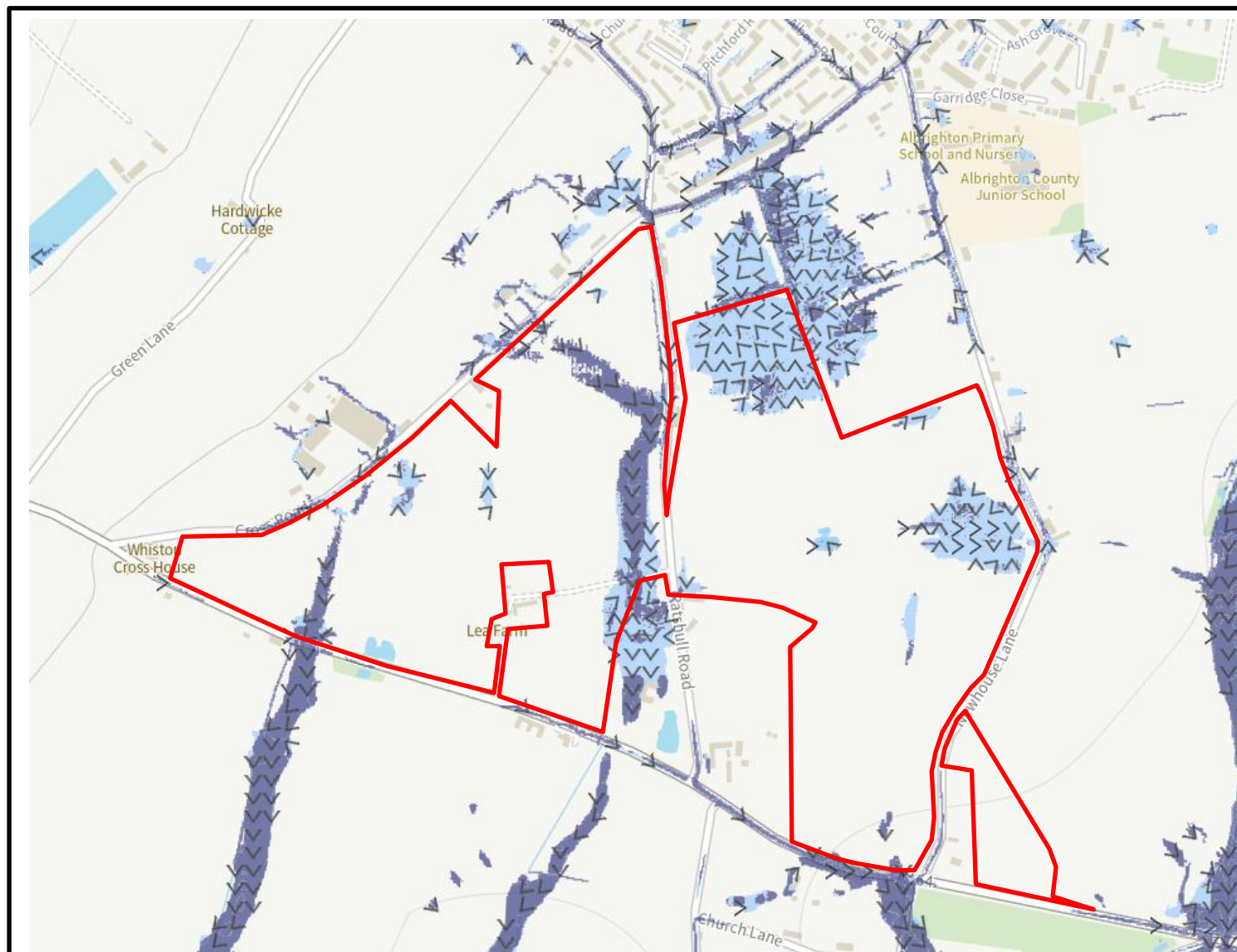
Environment Agency - Surface Water Flood Velocity Map - High Risk



Environment Agency - Surface Water Flood Velocity Map - Medium Risk



Environment Agency - Surface Water Flood Velocity Map - Low Risk



Surface water

○ Extent

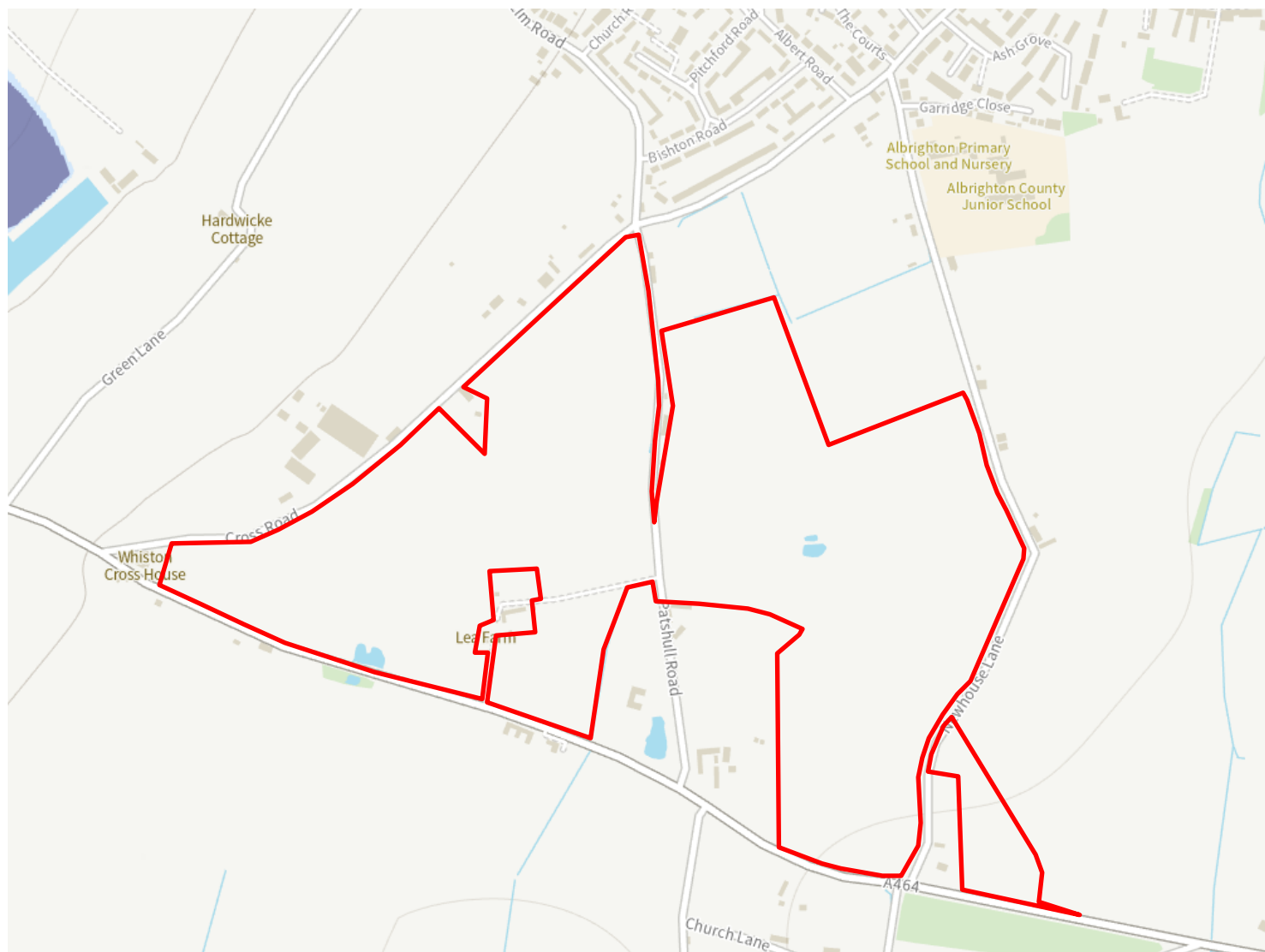
○ Depth

● Velocity

■ More than 0.25 m/s
Metres per second

■ Less than 0.25 m/s

> Direction



Reservoirs



Extent



When river levels are normal



When there is also flooding
from rivers

APPENDIX 5



South Staffordshire Council Local Plan Policies Map



Legend

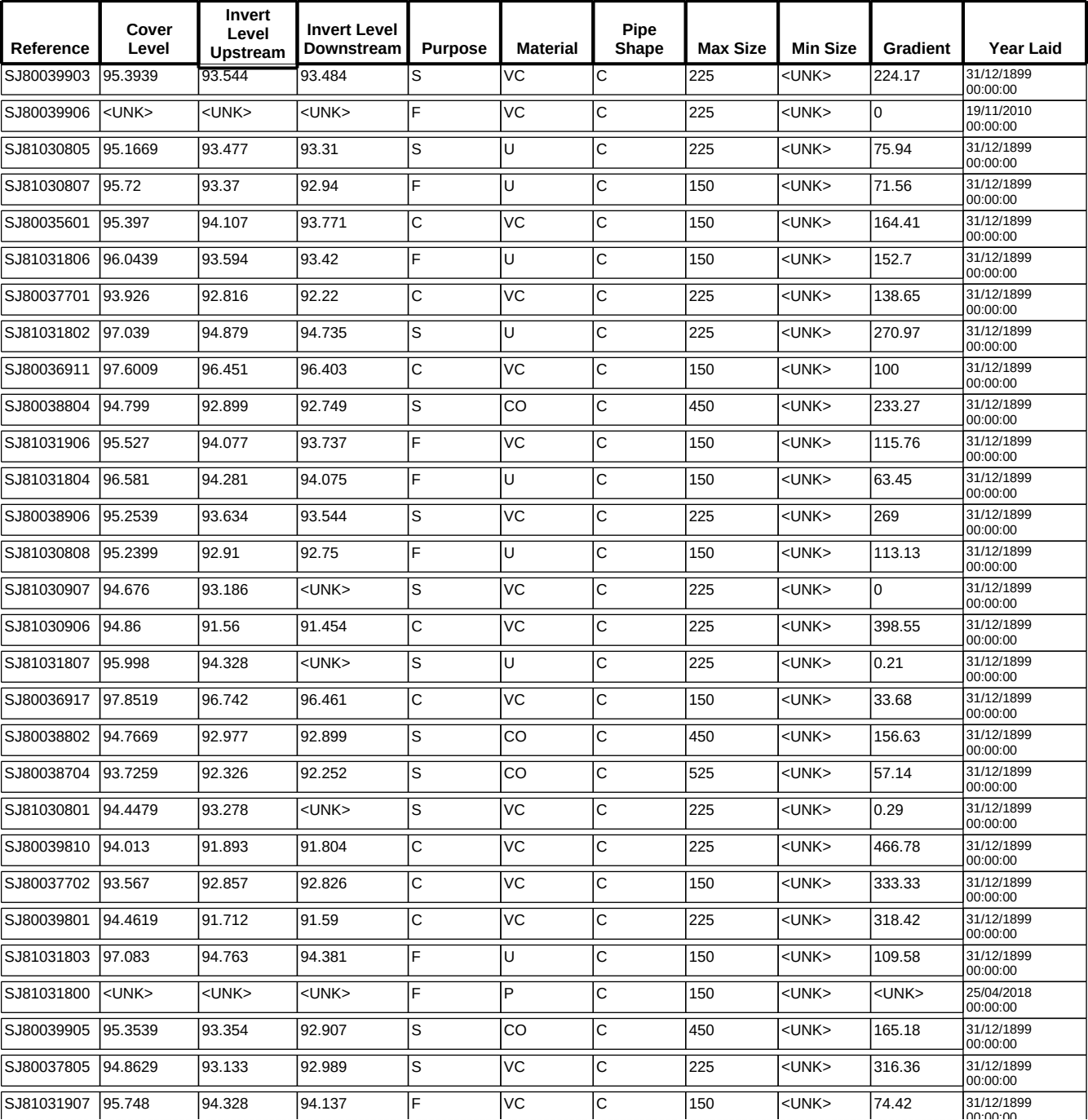
FloodZone2



FloodZone3



APPENDIX 6



Operational Site

Waste Water Pump

- Transfered Asset
- S104
- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage

- DS Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure

- STP Sewage Treatment Point
- STP Sewage Treatment Structure
- ST1P Sludge Treatment Point
- ST11 Sludge Treatment Structure

Manhole

- Twin Manhole

Foul Manhole

- Surface Water Manhole
- Combined Manhole
- Dual Manhole
- Unsurveyed Foul Manhole
- Unsurveyed Surface Water Manhole
- Unsurveyed Combined Manhole
- Unsurveyed Unknown Manhole

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

Pressure Sewer Pipe

- Transfered Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others
- 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 Vacuum 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 Latest Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Latest Drain
- S104 Combined Lateral Drain
- S104 Foul Latest Drain

Private Surface Water Latest Drain

- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transfered Surface Water Latest Drain
- Transfered Combined Lateral Drain
- Transfered Foul Lateral Drain

Ancillary

- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber

- Flushing Chamber
- Scowlaway
- Overflow

Fitting

- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewage Air Valve
- Sewage Chemical Injection Point
- Sewage Hatch Box

-	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	POLYETHYLENE
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

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

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

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

SEWER RECORD (Tabular)

O/S Map Scale: 1:5,000

This map is centred upon:

Date of Issue: 05-03-24

X: 380765.63 **Y:** 303473.36

Disclaimer Statement

2 Do not scale off this Map.

3 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.

4 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.

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WONDERFUL ON TAP



5th March 2024

Jessica Stevenson-Steels
St Andrews House
23 Kingfield Road
Sheffield
S11 9AS

Severn Trent Water Ltd
Oxley Moor Road
Wolverhampton
WV9 5HN

www.stwater.co.uk

Email:
Network.Solutions@SevernTrent.co.uk

Dear Jessica

Our ref: 1109468

Proposed Development: Holyhead Rd Albrighton

I refer to your 'Development Enquiry Request' of 2000 houses and school and commercial sites in respect of the above named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) which refer to surface water disposal from development sites.

Protective Strip

Due to a change in legislation on 1 October 2011, there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Ltd, which are not shown on the statutory sewer records, but are located in your client's land. These sewers would also have protective strips that we will not allow to be built over. If such sewers are identified to be present on the site, please contact us for further guidance.

Foul Water Drainage

The nearest network to receive flows is in Cross Rd to the north-Working on an estimated 30 properties per ha, and a development area of approx. 20ha we estimate there to be approx. 600 houses within the development, Estimated flows for the whole site we estimate to be approx. 10l/s(this can be amended when numbers are confirmed)

Due to surcharge levels within the sewer, historic flooding to the wider catchment area and capacity issues within the receiving treatment works, flows for the overall site but due to surcharge levels and the expected additional flows into the network downstream then additional investigation/modelling will be required.

Due to the performance of the downstream network, modelling will be required to better understand the impact of the additional properties on the public network.

In a change to our previous process, we no longer charge developers for the hydraulic modelling service. We will liaise with you over time with regards to the outcome of our investigations and any impact that may have on the planning status, occupation, or phasing of the site. However, while we can provide a brief summary of our findings if you need us to, we will no longer provide the full external capacity assessment report.

From the application you have submitted, I am assuming that the development has not been granted planning approval. In the meantime, the site will be added to our modelling tracker and reviewed regularly until the site can be progressed for sewer modelling. I would therefore be grateful if you would forward as soon as possible the following details:

- Confirmation whether a pumped solution is required (please provide pump rate and frequency, if available)
- Anticipated flow rate from the site including property numbers
- Proposed planned start and completion date
- Any phasing details of the proposed development
- Confirm how many properties will discharge into each of the connections to the public sewer.
- Planned occupation date

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 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).

Subject to above Severn Trent Water expects all surface water from the development to be drained in a sustainable way to the nearest watercourse or land drainage channel, including highway drainage etc. subject to the developer discussing all aspects of the developments surface water drainage, with the Local Lead Flood Authority (LLFA). Any discharge rate to a watercourse or drainage ditch will be determined by the LLFA / EA.

.

New Connections

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit a Section 106 application form. Our Developer Services department are responsible for handling all new connections enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 707 6600 or download from www.stwater.co.uk. We would suggest when numbers and plans progress that pre-design application is submitted(free of charge) to Joel.Haden@severntrent.co.uk, who will advise on best designs, due to the new infrastructure required.

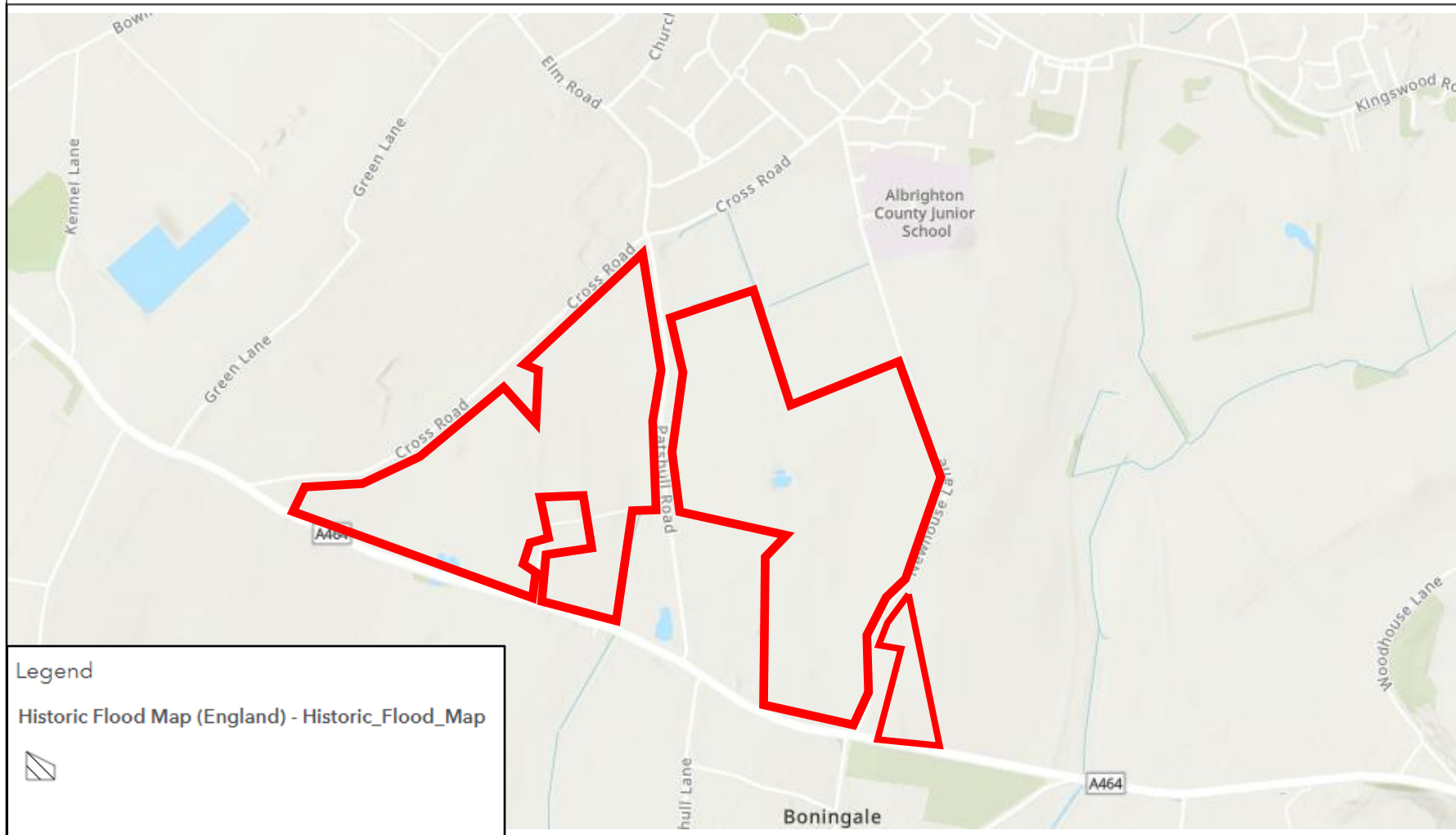
Please quote the reference 1109468 in any future correspondence (including e-mails) with STW Limited. Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely,

Michael Taylor
Network Solutions
Developer Services

APPENDIX 7

The Rivers Trust: Historic flood map



APPENDIX 8

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject: Surface Water Drainage	Designed	JSS
Storage Estimates	Checked	KBE
	Revision	B

Site Details :**Information From Wallingford Maps :**

East-1			
Location :	Cross Road, Albington	M5-60	20.0 mm
Grid Ref :	380707E, 303359N	r	0.40
		SAAR	683 mm
Total Site Area	10.840 ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u> ha	Soil Type	2
Effective Drainage Area	10.840 ha	SOIL	0.3 (Section 7.4)

Total Impermeable	4.525 ha
Allow for Urban Creep	<u>0.144</u> ha
Total Impermeable	4.669 ha

PIMP	43.1%	
PR	<u>28.0</u>	Equation 7.3
Cv	0.65	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550 metres
			Approx. Time of Flow	9.2 mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System	1.4 Litres/sec.ha
	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85 %
Average Rate of Flow	5.4 Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3500	3600	3700	3800	3900	4000	4100
Average Point Intensity (mm/hr)	1.7	1.6	1.6	1.6	1.5	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	4593.0	4617.3	4641.0	4664.2	4686.9	4709.0	4730.7
With climate change	6430.2	6464.2	6497.4	6529.9	6561.6	6592.7	6623.0
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	1133.8	1166.1	1198.4	1230.7	1263.0	1295.3	1327.6
Storage Volume for this Duration (m3)	5296	5298	5299	5299	5299	5297	5295

Storage Volume Required for

100 Year Return Period = **5299 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	B

Site Details :**Information From Wallingford Maps :**

East-2			
Location :	Cross Road, Albington	M5-60	20.0 mm
Grid Ref :	380707E, 303359N	r	0.40
		SAAR	683 mm
Total Site Area	5.470 ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u> ha	Soil Type	2
Effective Drainage Area	5.470 ha	SOIL	0.3 (Section 7.4)

Total Impermeable	2.376 ha	
Allow for Urban Creep	<u>0.094</u> ha	10% roof area
Total Impermeable	2.470 ha	

PIMP	45.2%	
PR	<u>29.8</u>	Equation 7.3
Cv	0.66	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550 metres
			Approx. Time of Flow	9.2 mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System		Litres/sec.ha
	3.5	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85	%
Average Rate of Flow	3.0	Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3100	3200	3300	3400	3500	3600	3700
Average Point Intensity (mm/hr)	1.9	1.8	1.8	1.7	1.7	1.6	1.6
Volume of Run-off for the period = Area x Cv x i x D (m3)	2375.1	2389.4	2403.3	2416.8	2430.0	2442.8	2455.4
With climate change	3325.2	3345.1	3364.6	3383.5	3402.0	3420.0	3437.6
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	555.0	572.8	590.7	608.5	626.4	644.2	662.1
Storage Volume for this Duration (m3)	2770	2772	2774	2775	2776	2776	2775

Storage Volume Required for

100 Year Return Period = **2776 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	B

Site Details :**Information From Wallingford Maps :**

East-3			
Location :	Cross Road, Albington	M5-60	20.0 mm
Grid Ref :	380707E, 303359N	r	0.40
		SAAR	683 mm
Total Site Area	7.610 ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u> ha	Soil Type	2
Effective Drainage Area	7.610 ha	SOIL	0.3 (Section 7.4)

Total Impermeable	4.566 ha	60%	assumed impermeable area
Allow for Urban Creep	<u>0.000</u> ha		
Total Impermeable	4.566 ha		

PIMP	60.0%	
PR	<u>42.1</u>	Equation 7.3
Cv	0.70	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550 metres
			Approx. Time of Flow	9.2 mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System	1.4 Litres/sec.ha
	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85 %
Average Rate of Flow	5.4 Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3400	3500	3600	3700	3800	3900	4000
Average Point Intensity (mm/hr)	1.7	1.7	1.6	1.6	1.6	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	4467.3	4491.7	4515.4	4538.6	4561.3	4583.5	4605.2
With climate change	6254.2	6288.3	6321.6	6354.1	6385.8	6416.9	6447.2
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	1111.4	1144.0	1176.6	1209.2	1241.8	1274.4	1307.0
Storage Volume for this Duration (m3)	5143	5144	5145	5145	5144	5142	5140

Storage Volume Required for

100 Year Return Period = **5145 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	A

Site Details :**Information From Wallingford Maps :**

	East-4			
Location :	Cross Road, Albington	M5-60	20.0	mm
Grid Ref :	380707E, 303359N	r	0.40	
		SAAR	683	mm
Total Site Area	1.875	ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u>	ha	Soil Type	2
Effective Drainage Area	1.875	ha	SOIL	0.3 (Section 7.4)

Total Impermeable	0.866	ha
Allow for Urban Creep	0.000	ha
Total Impermeable	0.866	ha

PIMP	46.2%	
PR	<u>30.6</u>	Equation 7.3
Cv	0.66	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550	metres
			Approx. Time of Flow	9.2	mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System	1.4	Litres/sec.ha
		Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85	%
Average Rate of Flow	1.0	Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3400	3500	3600	3700	3800	3900	4000
Average Point Intensity (mm/hr)	1.7	1.7	1.6	1.6	1.6	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	847.3	851.9	856.4	860.8	865.1	869.3	873.4
With climate change	1186.2	1192.7	1199.0	1205.1	1211.2	1217.0	1222.8
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	210.8	217.0	223.2	229.3	235.5	241.7	247.9
Storage Volume for this Duration (m3)	975	976	976	976	976	975	975

Storage Volume Required for

100 Year Return Period = **976 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	B

Site Details :**Information From Wallingford Maps :**

West-1				
Location :	Cross Road, Albington	M5-60	20.0	mm
Grid Ref :	380707E, 303359N	r	0.40	
		SAAR	683	mm
Total Site Area	7.280	ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u>	ha	Soil Type	2
Effective Drainage Area	7.280	ha	SOIL	0.3 (Section 7.4)

Total Impermeable	3.526	ha
Allow for Urban Creep	0.103	ha
Total Impermeable	3.629	ha

PIMP	49.8%	
PR	<u>33.6</u>	Equation 7.3
Cv	0.67	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550	metres
			Approx. Time of Flow	9.2	mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System	1.4	Litres/sec.ha
		Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85	%
Average Rate of Flow	4.2	Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3400	3500	3600	3700	3800	3900	4000
Average Point Intensity (mm/hr)	1.7	1.7	1.6	1.6	1.6	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	3550.5	3569.9	3588.8	3607.3	3625.3	3642.9	3660.1
With climate change	4970.8	4997.9	5024.3	5050.2	5075.4	5100.1	5124.2
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	858.3	883.5	908.6	933.8	959.0	984.2	1009.3
Storage Volume for this Duration (m3)	4112	4114	4116	4116	4116	4116	4115

Storage Volume Required for

100 Year Return Period = **4116 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Alrbighton	Date	20.06.2024
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	B

Site Details :**Information From Wallingford Maps :**

West-2			
Location :	Cross Road, Albrighton	M5-60	20.0 mm
Grid Ref :	380707E, 303359N	r	0.40
		SAAR	683 mm
Total Site Area	4.410 ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u> ha	Soil Type	2
Effective Drainage Area	4.410 ha	SOIL	0.3 (Section 7.4)

Total Impermeable	2.188 ha
Allow for Urban Creep	0.045 ha
Total Impermeable	2.233 ha

PIMP	50.6%	
PR	<u>34.3</u>	Equation 7.3
Cv	0.68	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550 metres
			Approx. Time of Flow	9.2 mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System		Litres/sec.ha
	3.5	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85	%
Average Rate of Flow	3.0	Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3000	3100	3200	3300	3400	4100	4200
Average Point Intensity (mm/hr)	1.9	1.9	1.8	1.8	1.7	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	2133.8	2147.1	2159.9	2172.5	2184.7	2262.5	2272.7
With climate change	2987.3	3005.9	3023.9	3041.5	3058.6	3167.5	3181.8
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	537.1	555.0	572.8	590.7	608.5	733.5	751.3
Storage Volume for this Duration (m3)	2450	2451	2451	2451	2450	2434	2430

Storage Volume Required for

100 Year Return Period = **2451 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	A

Site Details :**Information From Wallingford Maps :**

West-3				
Location :	Cross Road, Albington	M5-60	20.0	mm
Grid Ref :	380707E, 303359N	r	0.40	
		SAAR	683	mm
Total Site Area	2.640	ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u>	ha	Soil Type	2
Effective Drainage Area	2.640	ha	SOIL	0.3 (Section 7.4)

Total Impermeable	1.256	ha
Allow for Urban Creep	0.042	ha
Total Impermeable	1.298	ha

PIMP	49.2%	
PR	<u>33.1</u>	Equation 7.3
Cv	0.67	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550	metres
			Approx. Time of Flow	9.2	mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

Maximum Permitted Rate of Flow from the System		Litres/sec.ha
	3.5	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85	%
Average Rate of Flow	3.0	Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	1500	1600	1700	1800	1900	2000	2100
Average Point Intensity (mm/hr)	3.3	3.2	3.0	2.9	2.8	2.7	2.6
Volume of Run-off for the period = Area x Cv x i x D (m3)	1085.4	1099.2	1112.3	1124.7	1136.5	1147.9	1158.7
With climate change	1519.5	1538.9	1557.2	1574.6	1591.2	1607.0	1622.2
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	269.4	287.2	305.1	322.9	340.8	358.6	376.5
Storage Volume for this Duration (m3)	1250	1252	1252	1252	1250	1248	1246

Storage Volume Required for

100 Year Return Period = **1252 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)

Project: 48842	Sheet	1.00
location Cross Road	Job No.	48852
town Albington	Date	20.06.24
Subject:	Designed	JSS
Surface Water Drainage	Checked	KBE
Storage Estimates	Revision	B

Site Details :**Information From Wallingford Maps :**

West-4			
Location :	Cross Road, Albington	M5-60	20.0 mm
Grid Ref :	380707E, 303359N	r	0.40
		SAAR	683 mm
Total Site Area	7.800 ha	UCWI	71 (Fig. 9.7)
Deduct areas to soakaways	<u>0.000</u> ha	Soil Type	2
Effective Drainage Area	7.800 ha	SOIL	0.3 (Section 7.4)

Total Impermeable	4.130 ha
Allow for Urban Creep	<u>0.190</u> ha
Total Impermeable	4.320 ha

PIMP	55.4%	
PR	<u>38.2</u>	Equation 7.3
Cv	0.69	Equation 7.21
Default Cv	1.00	Designer to insert to override calculated Cv

Design Return Period	100	Years	Max. Branch Length	550 metres
			Approx. Time of Flow	9.2 mins

Percentage Increase For Climate Change: **40%**

Details of Restricted Discharge :

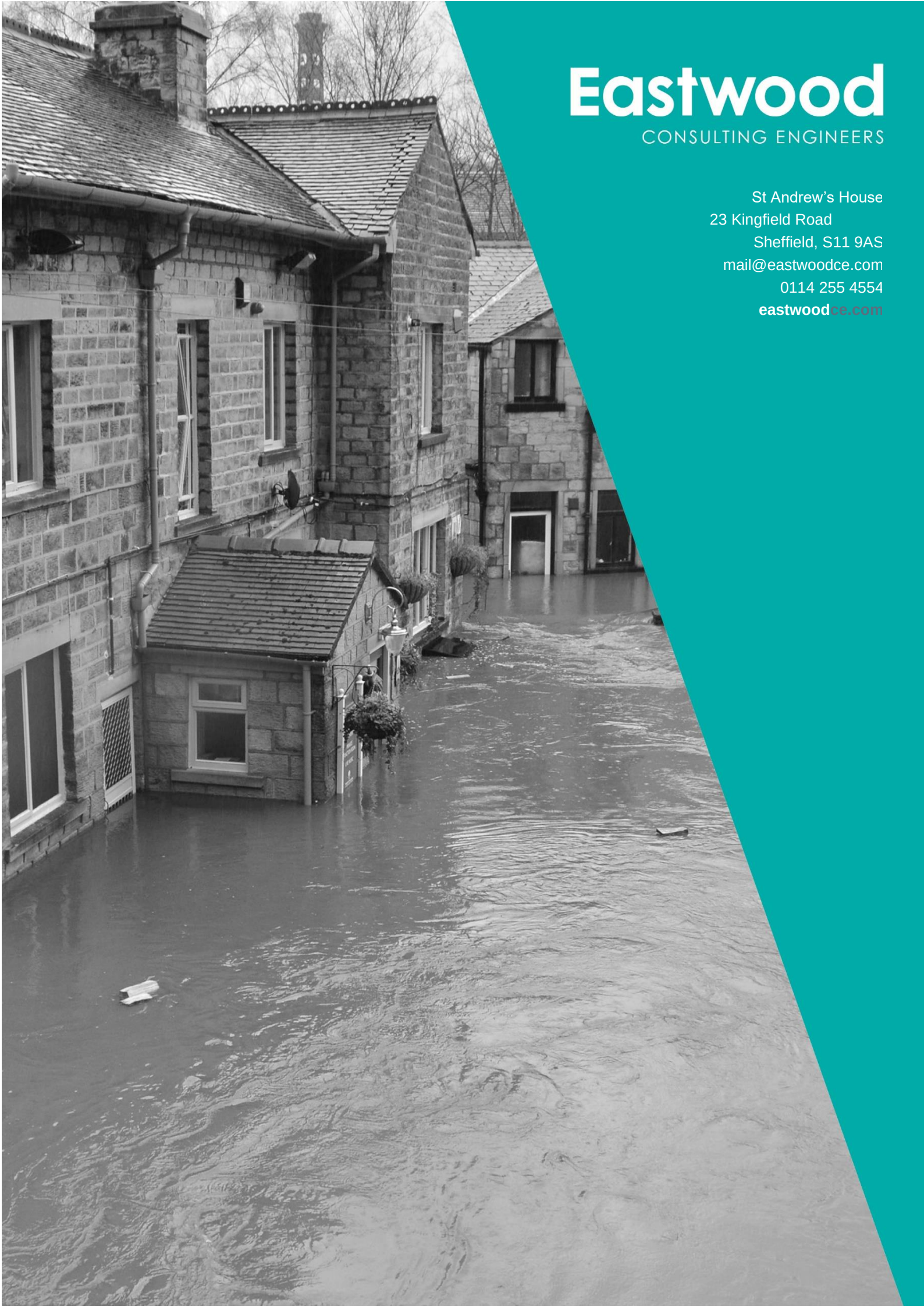
Maximum Permitted Rate of Flow from the System	1.4 Litres/sec.ha
	Litres/sec
Assumed Average Flow as a Proportion (Estimate)	85 %
Average Rate of Flow	4.9 Litres/sec

Calculation of Critical Duration and Storage Volume Required :

Trial Durations (mins)	3500	3600	3700	3800	3900	4000	4100
Average Point Intensity (mm/hr)	1.7	1.6	1.6	1.6	1.5	1.5	1.5
Volume of Run-off for the period = Area x Cv x i x D (m3)	4249.7	4272.2	4294.1	4315.6	4336.5	4357.0	4377.1
With climate change	5949.5	5981.0	6011.8	6041.8	6071.2	6099.9	6128.0
Volume of Out-flow for the period = Ave. flow x (D+Tf)(m3)	1034.8	1064.3	1093.8	1123.3	1152.7	1182.2	1211.7
Storage Volume for this Duration (m3)	4915	4917	4918	4919	4918	4918	4916

Storage Volume Required for

100 Year Return Period = **4919 m³**
 Is this the worst case (ie. Critical Duration)? 1 (1 = Yes, 0 = No)



Eastwood

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