CRESCENT PLACE

STORRINGTON ROAD, THAKEHAM, WEST SUSSEX,
RH20 3ED



Drainage Strategy

October 2026

eas ltd
Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	Data
Report Reference	940/DownsviewAssociates/CrescentPlace/Drainage
Date	October 2026
Client	Michael Lowdell
Report type	Drainage Strategy
Purpose	Planning
Revisions	-
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Drainage Strategy

October 2026

CONTENTS

1. BACKGROUND, EXISTING SITE & PROPOSED DEVELOPMENT

2. GEOLOGY & HYDROGEOLOGICAL CONSIDERATIONS

3. EXISTING SITE DRAINAGE

4. SOIL PERMEABILITY

5. SURFACE WATER DRAINAGE OPTIONS

6. PROPOSED FOUL DRAINAGE

7. DRAINAGE DESIGN SUMMARY

8. OPERATION AND MAINTENANCE OF THE SYSTEM

9. SUMMARY OF CONCULSIONS

APPENDIX A: FIGURES AND DRAWINGS

Figure 1: Site Location
Figure 2: Proposed Development
Figure 3: Suggested Drainage Arrangement

APPENDIX B: ENVIRONMENT AGENCY FLOOD MAPS FOR PLANNING

APPENDIX C: H R WALLINGFORD GREENFIELD FLOW RATES

APPENDIX D: OUTPUT FROM DRAINAGE DESIGN SOFTWARE

APPENDIX E: PHOTOGRAPHS

APPENDIX F: SOUTHERN WATER SEWER PLANS

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Drainage Strategy

October 2026

1. BACKGROUND, EXISTING SITE & PROPOSED DEVELOPMENT

1.1 The site is currently a garden for the main house, Crescent Place, entirely laid to lawn, shrubs and mature trees. It is accessed from Storrington Road to the southwest by an existing entrance. The site is bordered to the north by a residential dwelling Little Snapes, to the east by Snapes Farm and associated agricultural buildings, to the south by residential dwellings, Appleton and 50 and 48 Crescent Rise and to the west by Storrington Road, public highway with residential dwellings on the far side. The site area (redline boundary) is approximately 0.34 ha. The Ordnance Survey map reference for the centre of the site is TQ 10069 15279. The site elevation for the centre of the site is approximately +43 m OD. See Appendix A Figure 1 for the site location plan.

1.2 It is proposed to develop the garden of the existing house for residential accommodation comprising a two-storey, four-bedroom dwelling, with a car port and parking. See Figure 2 in Appendix A for the proposed site layout.

2. GEOLOGY & HYDROGEOLOGICAL CONSIDERATIONS

2.1 According to the British Geological Survey website, the site lies on Fittleworth Member- sandstone and mudstone with a superficial deposit of Head - clay, silt, sand and gravel overlying. The Department for Environment, Food and Rural Affairs (DEFRA) online mapping (MAGIC) shows the site to be lying on a Secondary A bedrock aquifer and Secondary undifferentiated superficial aquifer. DEFRA classify the soil type as *"Freely draining slightly acid loamy soils"*. The site lies on an area of 'Medium-High' groundwater vulnerability and is not in a groundwater source protection zone (SPZ).

2.2 There are two unnamed watercourses/drainage ditches that bisect the site, flowing from the east and northwest before they merge in the centre of the site. The ditches exit the site via a 450-diameter culvert flowing west, under Storrington Road, and continuing southwest to discharge into the River Stor, 2km away.

2.3 According to the Environment Agency's Flood Maps for Planning, the site lies in Flood Zone 1 (low risk of flooding from fluvial sources where defences are not considered or <0.1%% AEP of flooding in any given year). The site is shown to be at risk of surface water flooding in the 1 in 30-year scenario along the area of the watercourse/ditch that crosses the site from the northwest to southeast and east to west, as well as a strip of flood risk that joins the area of surface water flood risk in Storrington Road. This area of surface water flood risk increases in

size and depth in the 1 in 100-year and 1 in 1000-year scenarios. Groundwater and reservoir flooding is considered unlikely at this location. The location of the proposed dwelling to the north of the site is not at risk of flooding in all scenarios, the location of the car port appears to be at risk from surface water flooding in the 1 in 30-years and above. The nearest main river is the River Stor, some 2 km west of the site. See Appendix B for the flood maps for the site.

3 EXISTING SITE DRAINAGE

3.1 The site was visited on the 13 October 2026.

3.2 The site currently drains its surface water as greenfield across the site in a westerly direction to the existing drainage ditch that bisects the site. There is a public foul sewer for the site in Storrington Road which drains the foul sewage from the existing house. See Appendix E for photographs of the watercourse/ditch and Appendix F for the Southern Water sewer plans for the site.

4 SOIL PERMEABILITY

4.1 Percolation testing was previously conducted at the site by GTA Civils and Transport Ltd in January 2023. The investigation was carried out generally in accordance with BRE Digest 365. Testing of the sub soil, which was noted as Clay, did not produce a useable percolation coefficient and drainage of surface water to soakaway was not considered to be practicable for the site. Groundwater seepage was encountered during the testing at a depth of 0.9 m.

5 SURFACE WATER DRAINAGE OPTIONS

5.1 There is a general requirement that new drainage systems should be sustainable (SuDS) and that flow leaving the site should not exceed the Greenfield flow rate, including both surface water and treated sewage effluent.

5.2 The area of impermeable surface will be increased by the proposed redevelopment by the roof area of the proposed dwelling and the car port.

5.3 The proposed development will have an impermeable surface area of approximately 215 m^2 comprising the roof of the proposed dwelling and the car port. The use of permeable surfacing in the driveway, parking area and patio area to the rear of the dwelling and water butts on the drainpipe downpipes for use in irrigation will reduce the surface area to be drained and make the development more sustainable.

5.4 The Greenfield runoff rate for the site has been calculated using the UK SuDS tools. The results are shown in See Appendix C and summarised in Table 5.1 below:

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TABLE 5.1
GREENFIELD RUNOFF RATES

Return period	Flow rates (l/s)
Qbar	1.6
1 in 1 year	1.3
1 in 2 year	1.4
1 in 10 year	2.5
1 in 30 year	3.6
1 in 100 year	5.0
1 in 200 year	5.9

5.5 The current non-statutory guidance indicates that the maximum discharge permitted to leave the site from the drained area post development should not exceed the 1 in 1 year return period flow rate (1.3 l/s), or as near as practicable. Flow controlled vortex valves or orifices exist that can control the flow to as low as 2 l/s to reduce the flow to a suitable rate so as not to overload the local surface water drainage system and reduce the impact on the local watercourses. See Appendix C for the HR Greenfield Flow Rate tool data.

5.6 According to the SuDS manual, UK runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

- *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 another piped surface water drainage system*
- *priority 5: discharged to a combined sewer*

(priority 1 is the highest priority and priority 5 is the lowest.)

5.7 Rainwater harvesting in the form of water butts for garden watering should be included in the plans for the dwelling - *collection for the non-potable use*, this could reduce the volume of runoff from the roof of the dwelling. The inclusion of permeable surfacing in the driveway, parking area and patio area will allow some of the surface water to *infiltrate to the ground*, making the development more sustainable and reducing the runoff from non-permeable surfaces making the development more sustainable in line with the SuDS hierarchy.

5.8 Discharge to soakaway requires suitably permeable ground. The soil at the site (Fittleworth Member) has insufficient permeability for soakaway drainage as confirmed by percolation testing done onsite previously by GTA Civil and Transport Ltd (January 2023). This method of surface water drainage has not been considered further.

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5.9 The alternative method for drainage of surface water is to drain to attenuation storage where the excess surface water is stored in a pond, swale or underground attenuation storage crate and released at the greenfield 1 in 1-year rate to a watercourse, or surface water sewer. In this case a suitable watercourse/ditch crosses the site. This is the most practicable method of disposing of surface water onsite in line with the SuDS hierarchy.

5.10 It is proposed to drain the surface water from the developed site to an underground crate attenuation storage unit (modular, lightweight plastic subterranean unit, wrapped in an impermeable geomembrane) overspilling via a vortex valve, limiting the flow to 2 l/s into the watercourse/ditch that crosses the site. This is the preferred method of disposal of surface water from the developed site in line with the SuDS hierarchy. The use of water butts on the drainpipe down pipes for use in watering the gardens could further reduce the runoff from the site.

5.11 A suitable area to locate an attenuation storage unit would be under the permeable parking area to the northwest of the proposed car port and discharging into the drainage ditch to the southeast of the proposed new bridge. The attenuation crate would need to accept any surface water runoff from the roof of the proposed dwelling and the car port. See Figure 3 in Appendix A for the drainage design.

5.12 The NPPF states:

"Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control the flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible facilitating improvements in water quality and biodiversity."

5.13 The use of permeable surfacing, and the inclusion of water butts on the drainpipe downpipes for use in garden watering, will reduce the runoff from the site. Rain gardens are another possible sustainable landscaping feature that combines functional benefits with the structural and aesthetic advantages to the development. They would intercept, slow, and filter stormwater runoff and increase the biodiversity by improving the quality of the surface water exiting the site.

5.14 A suitable sized attenuation storage unit for the residence would be 5 m x 5.5 m x 0.4 m deep as calculated by the MasterDrain drainage network model. The surface water runoff from the roofs of the buildings will be drained into an attenuation crate located to the southwest of the site, in the permeable paving area in front of the car port. The proposed drainage layout is shown in Figure 3 in Appendix A and output from the drainage design model can be seen in Appendix D.

5.15 **Design Storm**

The surface water drainage system has been designed for the 30-year return period event plus a 35% allowance for climate change and tested for surcharge

for the 1 in 100-year return period event (1% Annual Exceedance Probability) plus a 45% allowance for climate change. See Appendix A, Figure 3 for the proposed drainage design and Appendix D for pipe and chamber layout and sizing of the soakaway from the MasterDrain model.

5.16 Drainage Design Model

The attenuation crate is an underground, modular plastic matrix wrapped in an impermeable geomembrane, used to collect and store excess surface water and release it via a flow controlled vortex valve at the greenfield 1 in 1-year flow rate or as near a practicable (in this case 2 l/s – any lower and the valve/orifice is liable to silting and blocking) into the watercourse/drainage ditch that bisects the site and flows west via a culvert under Storrington Road and into the River Stor catchment. The geomembrane will protect the groundwater from any seepage from the surface water runoff. The chosen location is in the southwest of the site in front of the car port, under the permeable paved parking area. See Figure 3 in Appendix A for the suggested drainage arrangement. The attenuation storage unit has been sized at 5 m x 5.5 m x 0.4 m deep.

The drainage arrangement has been designed using the MasterDrain network drainage model.

5.17 Hydrological Data

Hydrological data for the site as used in the MasterDrain model is given in Appendix D.

5.18 Extreme Event

An extreme event, which overwhelmed the drainage system, would likely result in water flowing west across the surface of the ground with the topography of the land towards the existing watercourse/drainage ditch that crosses the site, as with the existing scenario.

6. PROPOSED FOUL DRAINAGE

6.1 It is proposed to drain the foul sewage from the proposed dwelling on site via the Southern Water mains foul sewer located in Storrington Road, via chamber number 0202, as with the existing scenario. See Appendix F for the Southern Water Sewer plans for the site and Figure 3 in Appendix A for the suggested drainage layout.

7. DRAINAGE DESIGN SUMMARY

7.1 The surface water chamber sizes, invert levels and pipe sizes from the MasterDrain model are summarised in Table 7.1 below:

TABLE 7.1
SURFACE WATER CHAMBERS

No.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia (mm)
SW1	450	42.76	42.26	100
SW2	450	42.05	41.55	100
Attenuation	-	41.85	41.05	100
SW3 (vortex valve 2 l/s)	450	41.86	40.55	100

7.2 The foul sewage chamber sizes, invert levels and pipe sizes are given in Table 7.2 below:

TABLE 7.2
FOUL SEWAGE CHAMBERS

No.	Dia (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe dia out (mm)
FW1	450	42.43	41.93	100
0202	600	41.55	40.13	150

8 OPERATION AND MAINTENANCE OF THE SYSTEM

8.1 The drainage system will generally require minimal operational input once construction has been completed. However, it will require some regular maintenance.

8.2 Items requiring maintenance will include:

- Chambers (including any flow control devices) will require regular removal of any debris likely to obstruct and checking for any structural damage to the chamber or cover. Cleaning requires removing sediment, silt, and obstructions using high-pressure water jets or manual clearing. Ensure covers are secure and airtight to prevent odour, rodent, or water ingress. Maintenance should be carried out annually at the time of year after most leaf fall has occurred.

- Any gullies, pipes and channels will need regular removal of accumulated debris and silt. Annual cleaning (initially 3-6 months for high-debris areas) to remove leaves, sediment, and litter, to prevent blockages, odours, and flooding. Preventative measures like silt traps or drain guards will aid maintenance.

- The permeable surfacing will require regular cleaning to prevent clogging and ensure drainage, typically involving annual inspections, brushing to remove debris and vacuuming or pressure washing to clear joints of moss and debris and ensure the permeability is maintained.

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- The attenuation crate will need annual inspections and cleaning of inlet and outlet pipes and vortex valve to remove accumulated silt, debris and pollutants, prevent clogging and to check for and repair any structural issues.

9. SUMMARY OF CONCLUSIONS

9.1 The site is currently a garden for the main house, Crescent Place, entirely laid to lawn, shrubs and mature trees, which is accessed from Storrington Road to the southwest by an existing entrance.

9.2 It is proposed to develop the garden of the existing house for residential accommodation comprising a two-storey, four-bedroom dwelling, with a car port and parking. See Figure 2 in Appendix A for the proposed site layout.

9.3 According to the British Geological Survey website the site lies on Fittleworth Member- sandstone and mudstone. The Department for Environment, Food and Rural Affairs (DEFRA) online mapping (MAGIC) shows the site to be lying on a Secondary A bedrock aquafer and Secondary undifferentiated superficial aquifer. DEFRA classify the soil type as *"Freely draining slightly acid loamy soils"*. The site lies on an area of 'Medium-High' groundwater vulnerability and is not in a groundwater source protection zone (SPZ).

9.4 According to the Environment Agency's Flood Maps for Planning, the site lies in Flood Zone 1 (low risk of flooding from fluvial sources where defences are not considered or <0.1%% AEP of flooding in any given year). The site is shown to be at risk of surface water flooding in the 1 in 30-year scenario along the area of the drainage ditch that crosses the site from the northwest to southeast and east to west, as well as a strip of flood risk that joins the surface water flood risk in Storrington Road. This area of surface water flood risk increases in size and depth in the 1 in 100-year and 1 in 1000-year scenarios. Groundwater and reservoir flooding is considered unlikely at this location. The nearest main river is the River Stor, some 2 km west of the site. See Appendix B for the flood maps for the site.

9.5 The proposed development includes permeable surfacing in the new driveway, parking areas and the patio area to the rear of the proposed dwelling and water butts on the drainpipe downpipes. These SuDS measures will help reduce the amount of surface water leaving the site and keep the impact of the development on flood risk elsewhere to a minimum, making the development more sustainable in line with the SuDS hierarchy.

9.6 The preferred method for the disposal of surface water is drainage to an attenuation crate. The attenuation storage unit is to be located to the southwest of the site in front of the car port in the permeable paved parking area. A suitable sized attenuation storage unit would be 5 m x 5.5 m x 0.4 m deep. This is the preferred method for the disposal of surface water in line with the SuDS hierarchy.

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9.7 An extreme event overtopping the system would likely follow the topography of the land and flow west towards the existing watercourse/drainage ditch that crosses the site, as with the existing scenario.

9.8 It is proposed to drain the foul sewage from the dwelling into the Southern Water mains sewer located in Storrington Road via chamber number 0202, as with the existing scenario. See Appendix F for the Southern Water sewer, Figure 3 in Appendix A for the drainage design and Appendix D for the MasterDrain drainage design calculation data.

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APPENDIX A:

Figure 1: Site Location
Figure 2: Proposed Development
Figure 3: Suggested Drainage Arrangement

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Scale as shown

Crescent Place

Storrington Road, Thakeham, West Sussex, RH20 3ED

Figure 1: Site Location

October 2026



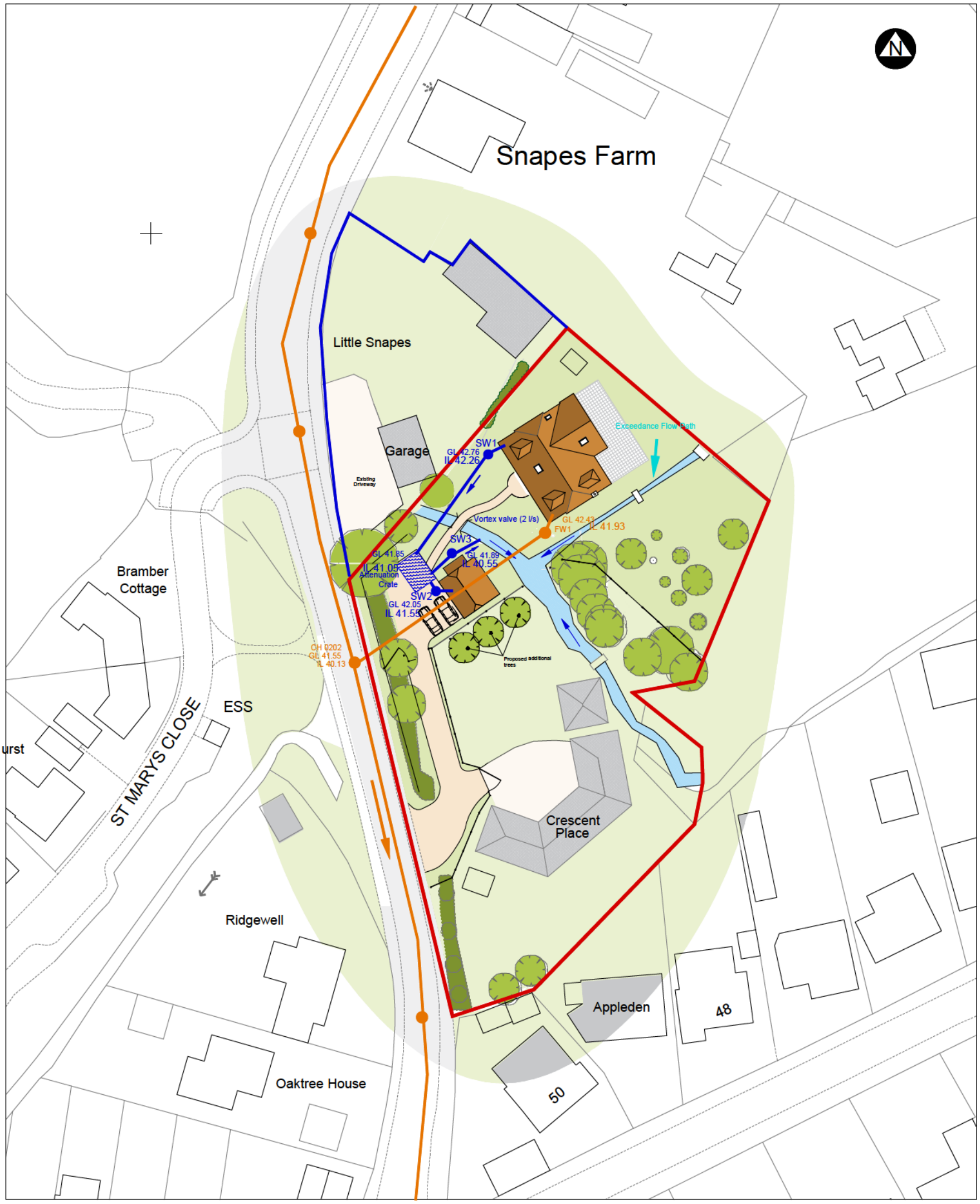
Scale as shown

Crescent Place

Storrington Road, Thakeham, West Sussex, RH20 3ED

Figure 2: Proposed Development

October 2026



revision			
address: Crescent Place, Storrington Road, Thakeham, RH20 3ED			
project: Proposed Construction of detached 4 bedroom chalet bungalow with detached garage/ car port on the land to the North of Crescent Place			
title: Proposed Block Plan			
scale: 1@500 @A4	date: October 25	dwg no.: 2022.351b.02	revision:

DOWNSVIEW ASSOCIATES Chartered Surveyors

Little Acorns
Hampers Lane
Storrington
West Sussex
RH20 3HZ

Tel: 07525 844965

Email: matt@downsview-surveyors.co.uk

Crescent Place

Scale as shown

Storrington Road, Thakeham, West Sussex, RH20 3ED

Figure 3: Drainage Design

October 2026

APPENDIX B:

ENVIRONMENT AGENCY FLOOD MAPS FOR PLANNING

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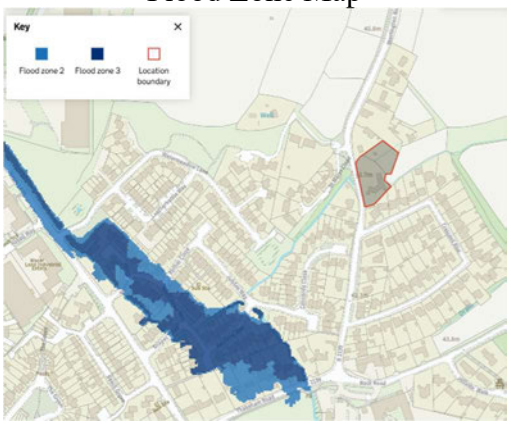
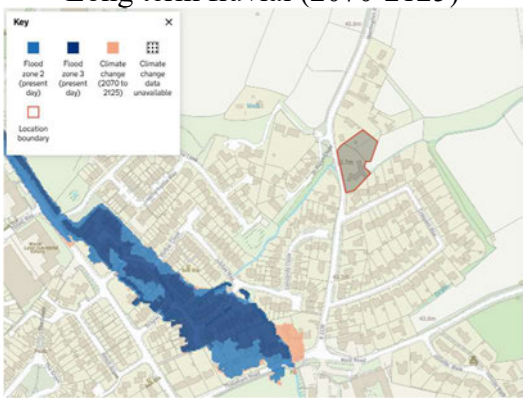
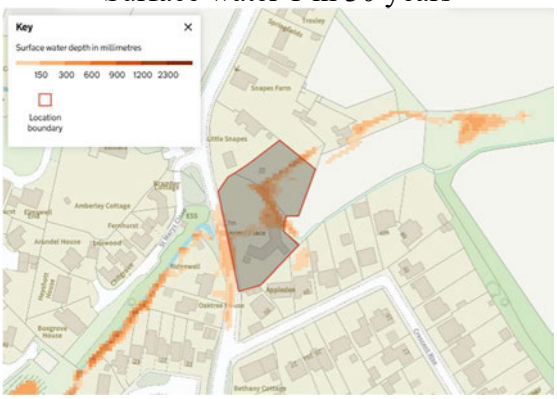
Flood Zone Map



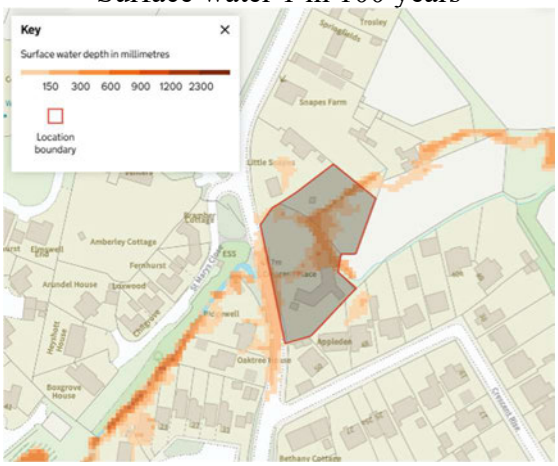
Long term fluvial (2070-2125)



Surface water 1 in 30 years



Surface water 1 in 100 years



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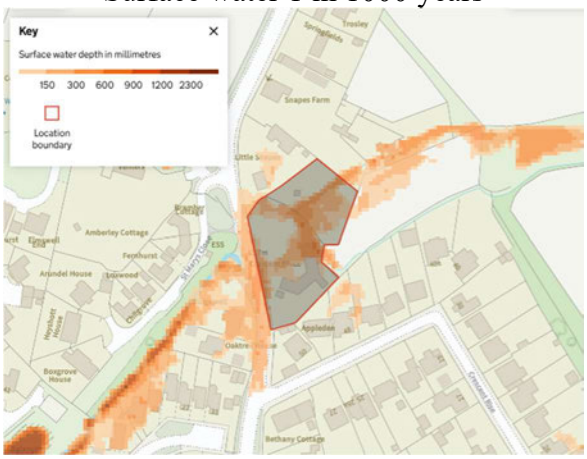
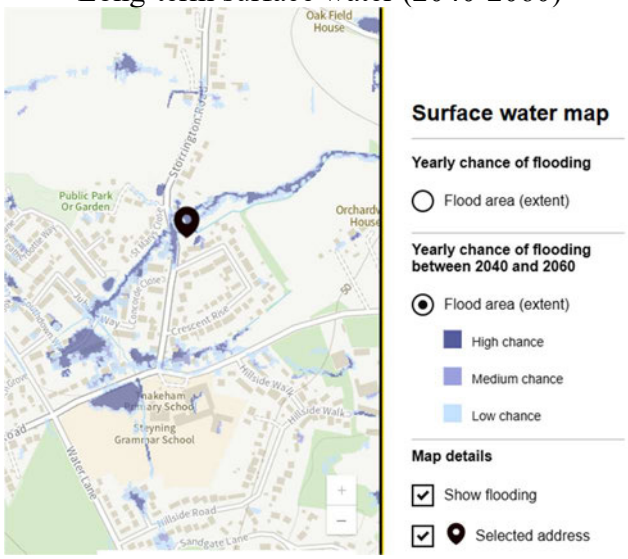
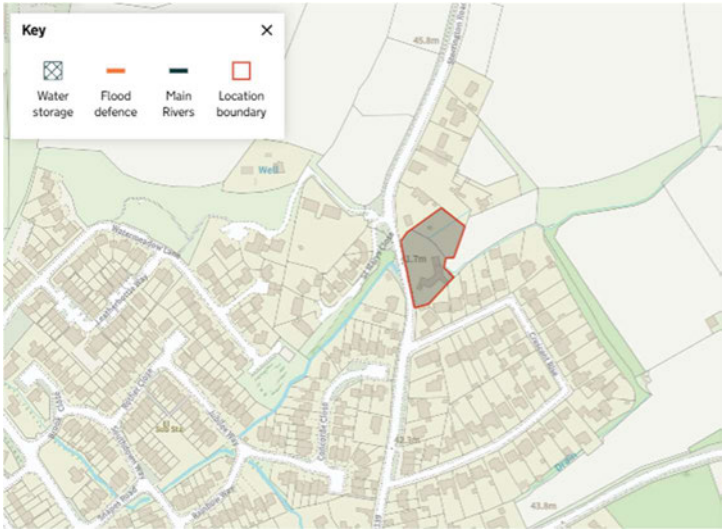
Surface water 1 in 1000 years



Long-term surface water (2040-2060)



Map showing nearest main watercourses including the drainage ditches that cross the site



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APPENDIX C:

HR WALLINGFORD GREENFIELD FLOW RATES

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Greenfield runoff rate estimation tool

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

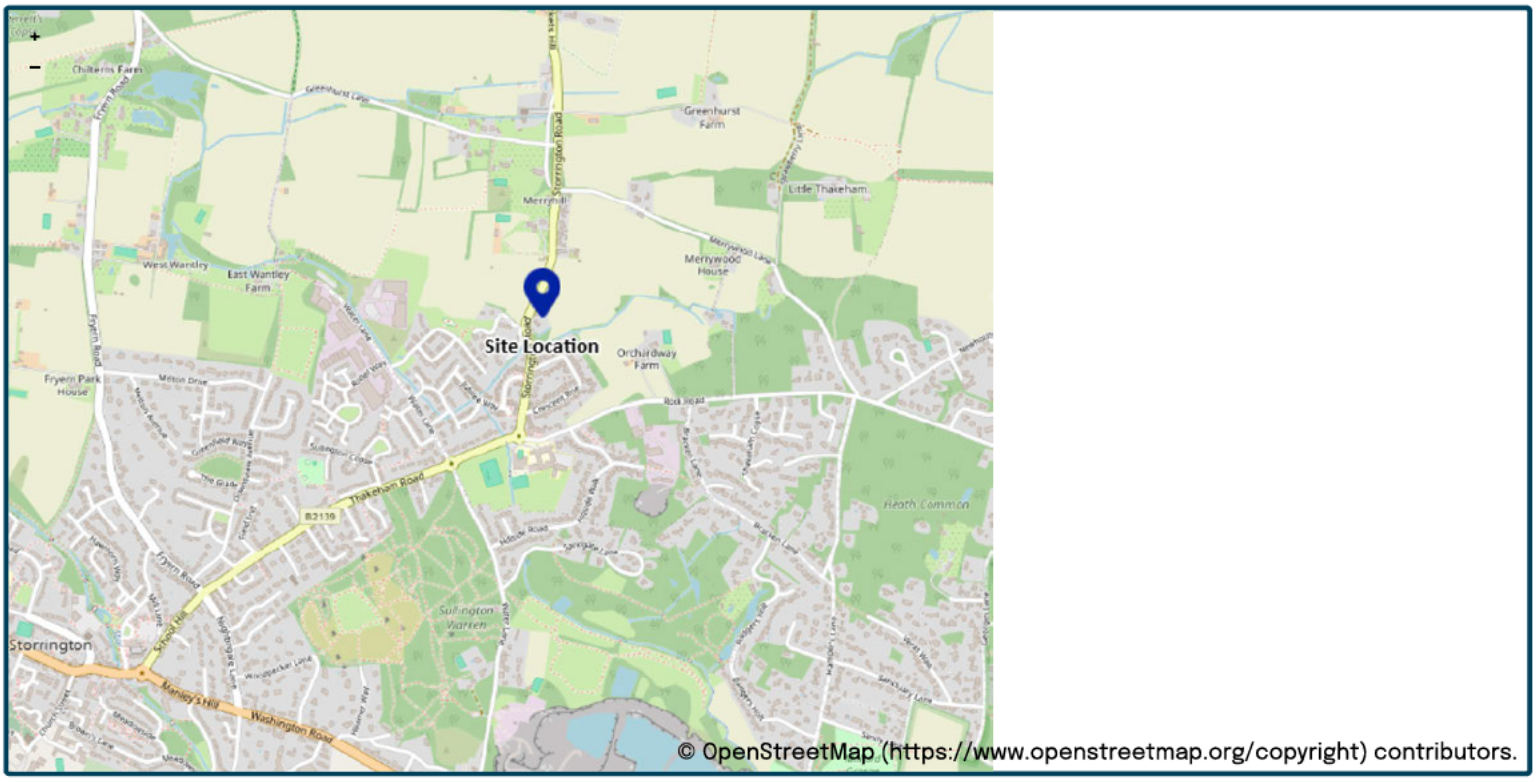
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	25/09/2026
Calculated by	EAS Ltd
Reference	940
Model version	2.2.3

Location

Site name	Crescent Place
Site location	Thakeham



Site easting (British National Grid)	510078
Site northing (British National Grid)	115271

Site details

Total site area (ha)	0.34 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value	
SAAR9120 (mm)	970	mm		
BFIHOST19scaled	0.578			
QMed-QBar conversion	1.136		1.136	
QMed (l/s)	1.4	l/s		
QBar (FEH statistical 2025) (l/s)	1.6	l/s		

Growth curve factors

	My value	Map value
Hydrological region	7	7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	1.3	l/s
Flow rate 2 year (l/s)	1.4	l/s
Flow rate 10 years (l/s)	2.5	l/s
Flow rate 30 years (l/s)	3.6	l/s
Flow rate 100 years (l/s)	5.0	l/s
Flow rate 200 years (l/s)	5.9	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:

OUTPUT FROM DRAINAGE DESIGN SOFTWARE AND DRAINAGE FIELD INFILTRATION CALCULATIONS

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http://www.easltd.co.uk

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West Sussex, RH17 5LZ
Tel: 01444 882552
email: info@easltd.co.uk

MasterDrain SW

Job No. 940			
Sheet no. 1			
Date 09/10/26			
Project Crescent Place	By XL	Checked	Reviewed
Title Surcharge calcs (Sized at 30 yrs storm) for CRESCENT PLACE.SW CCF = 45%			

Free flowing outlet
Return period = 100 yrs
Climate change factor = 45

PEAK hydrograph values printed
Storm duration = 15 mins
No offline storage

Mean rain intens. 272.00 mm/hr
Storm profile = Summer
Using FEH data

Peak rain intens. 1066.24 mm/hr
Sample period = 7.5 secs.

Entry No.		SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE fract.	SURCHARGE Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01	SW1	12.4	19.0	100	450	42.26	42.67	42.76	1.53	0.41	6.57	0.000	162	Warning
2	B	2.01	SW2	16.9	4.9	100	450	41.75	41.78	42.05	0.29	0.03	0.00	0.000	42	Warning
3	I	1.02	tenuation	14.4	23.9	100	1200	41.45	41.61	41.85	1.67	0.16	9.57	0.000	204	Warning
4	I	1.03	SW3‡	11.9	23.9	100	450	41.15	41.82	41.86	2.01	0.67	12.00	0.000	204	Warning

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Job No. 940			
Sheet no. 2			
Date 09/10/26			
Project Crescent Place	By XL	Checked	Reviewed
Title Surcharge calcs (Sized at 30 yrs storm) for CRESCENT PLACE.SW CCF = 45%			

MasterDrain SW

Notes

Printout headings

1) Entry no - position in file
2) Section no - pipe identifier
3) Manhole ref - Manhole identifier
4) Pipe cap - full bore capacity of that pipe
5) Rate of flow - calculated flow rate (l/s) ‡ = flow restrictor.
6) Pipe diam - outlet pipe diameter (mm)
7) Chamber diam - chamber diam. at base of MH
8) Invert level - invert level of manhole
9) Water level - calculated peak water level.
10) Grnd level - ground / cover level
11) Surch. fract - calc.flow/pipe capacity
12) Surch. depth - surcharge level above soffit
13) Overflow - surcharged flow rate (l/s)
14) Flooded vol - volume of water above cover
15) Upstrm Vol - upstream pipe vol to previous manhole(s)
16) Status - OK - outlet not surcharged
17) Status - Surcharged - outlet surcharged
18) Status - Warning - water level within 299mm of cover level
19) Status - Flooded - cover over-topped
20) § against diameter indicates throttle pipe used.

Title box

Hydrograph data

1) Ret. period - that used to calculate profile
2) Duration - length of storm (mins)
3) Profile - either Winter (75%) or Summer (50%)

Flow restrictors

Manhole reference - SW3 Restrictor flowrate - 2 l/s

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.

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Sheet no.	3
Date	09/10/26
By	XL
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Reviewed	

MasterDrain SW

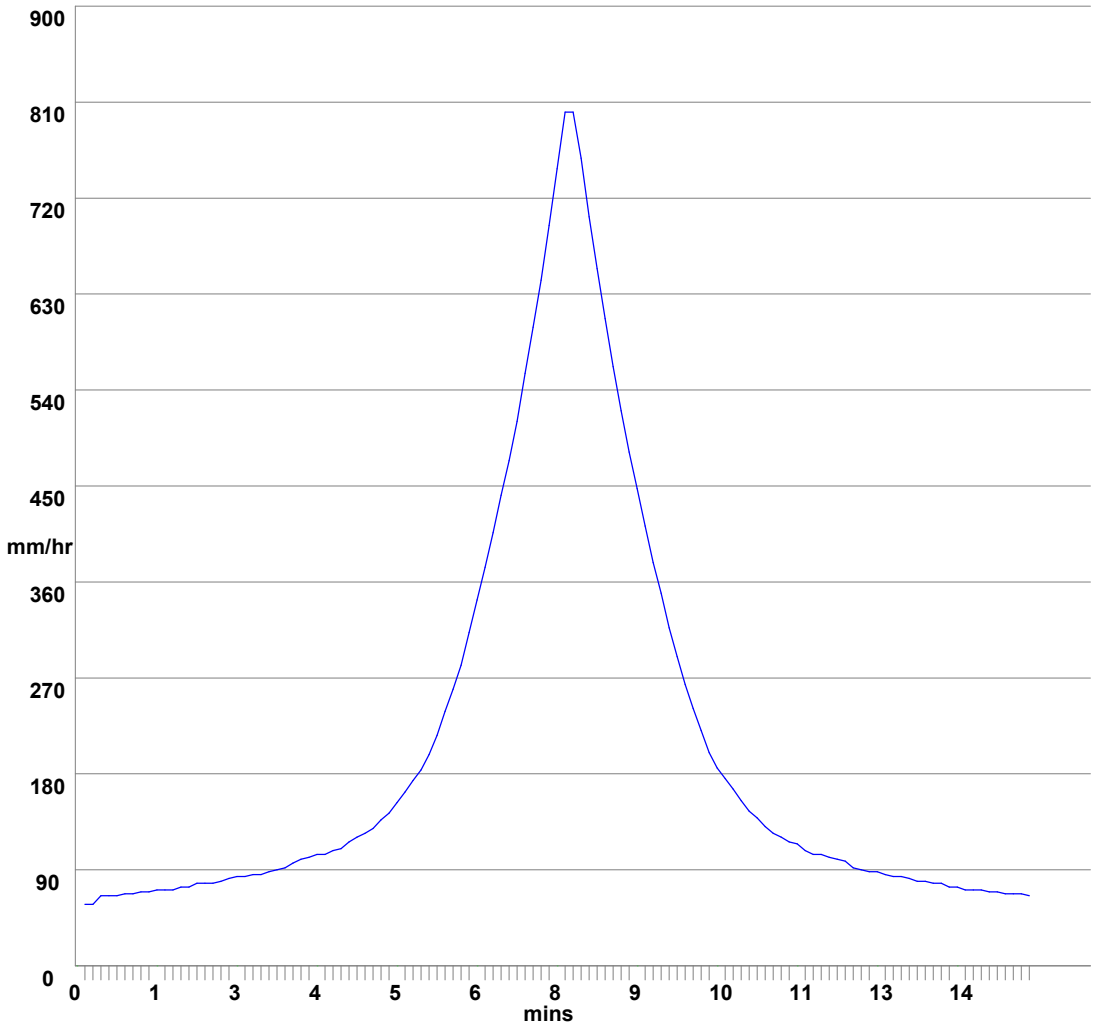
Project: Crescent Place

Title: Surcharge calcs (Sized at 30 yrs storm) for CRESCENT PLACE.SW CCF = 45%

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:08	63.50	5:08	181.44	10:08	195.04
0:15	63.50	5:15	192.78	10:15	183.70
0:22	72.57	5:22	204.12	10:22	172.36
0:30	72.57	5:30	219.99	10:30	161.03
0:38	72.57	5:38	240.40	10:38	154.22
0:45	74.84	5:45	265.35	10:45	145.15
0:52	74.84	5:52	288.03	10:52	138.35
1:00	77.11	6:00	312.98	11:00	133.81
1:08	77.11	6:08	347.00	11:08	129.27
1:15	79.38	6:15	381.02	11:15	127.01
1:22	79.38	6:22	415.04	11:22	120.20
1:30	79.38	6:30	451.32	11:30	115.67
1:38	81.65	6:38	489.88	11:38	115.67
1:45	81.65	6:45	526.17	11:45	113.40
1:52	86.18	6:52	566.99	11:52	111.13
2:00	86.18	7:00	616.88	12:00	108.86
2:08	86.18	7:08	664.51	12:08	102.06
2:15	88.45	7:15	714.41	12:15	99.79
2:22	90.72	7:22	771.11	12:22	97.52
2:30	92.99	7:30	830.07	12:30	97.52
2:38	92.99	7:38	889.04	12:38	95.25
2:45	95.25	7:45	889.04	12:45	92.99
2:52	95.25	7:52	841.41	12:52	92.99
3:00	97.52	8:00	780.18	13:00	90.72
3:08	99.79	8:08	725.75	13:08	88.45
3:15	102.06	8:15	673.58	13:15	88.45
3:22	106.59	8:22	623.69	13:22	86.18
3:30	111.13	8:30	578.33	13:30	86.18
3:38	113.40	8:38	535.24	13:38	81.65
3:45	115.67	8:45	496.68	13:45	81.65
3:52	115.67	8:52	458.13	13:52	79.38
4:00	120.20	9:00	419.57	14:00	79.38
4:08	122.47	9:08	387.82	14:08	79.38
4:15	129.27	9:15	351.53	14:15	77.11
4:22	133.81	9:22	322.05	14:22	77.11
4:30	138.35	9:30	292.57	14:30	74.84
4:38	142.88	9:38	267.62	14:38	74.84
4:45	151.95	9:45	244.94	14:45	74.84
4:52	158.76	9:52	222.26	14:52	72.57
5:00	170.10	10:00	206.38	15:00	72.57

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 15 mins Profile - summer



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Sheet no.	4
Date	09/10/26
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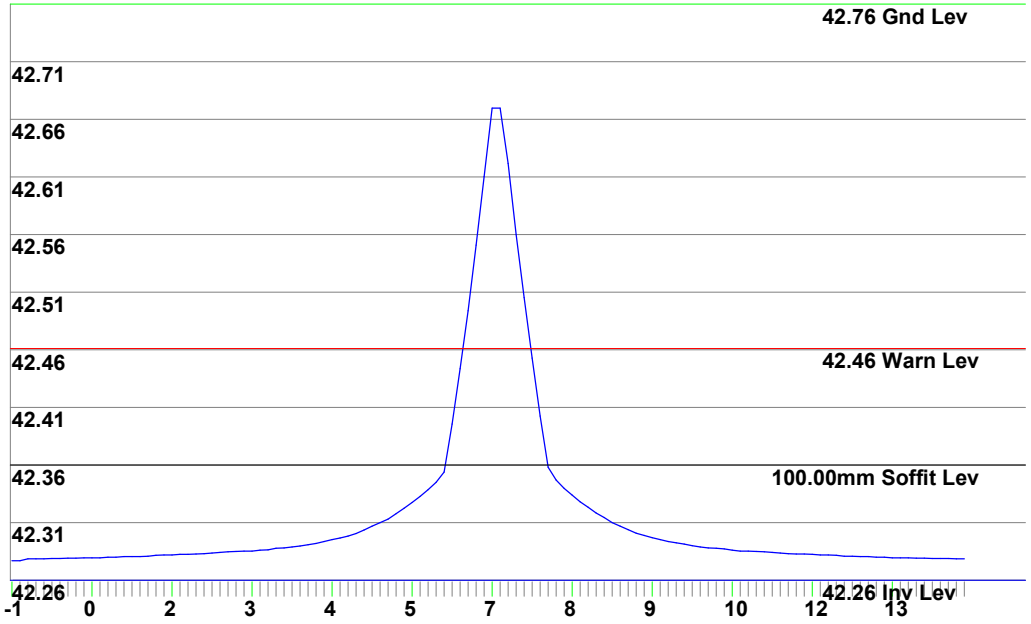
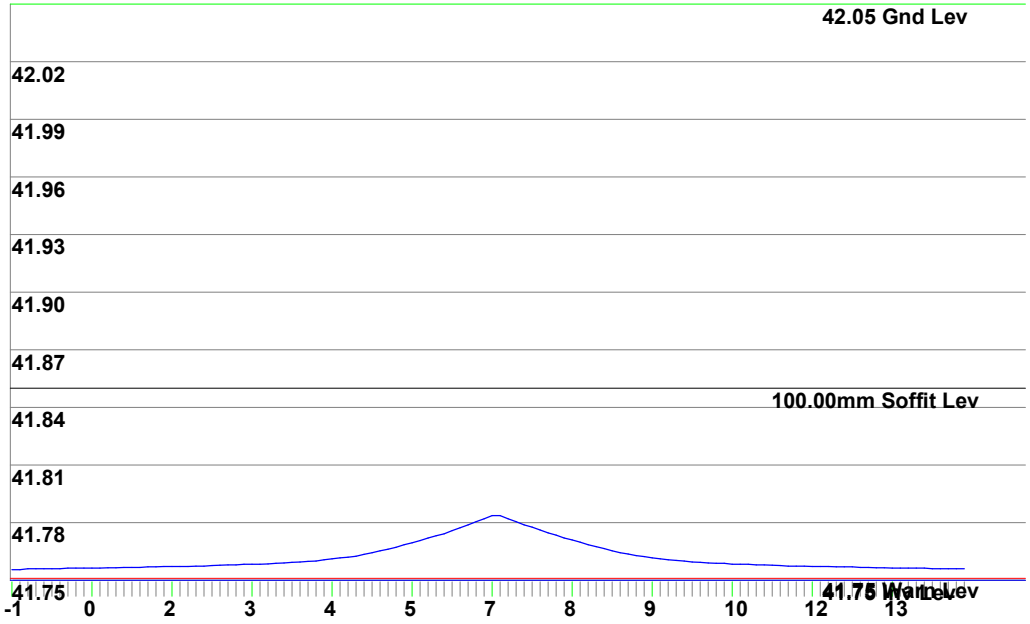
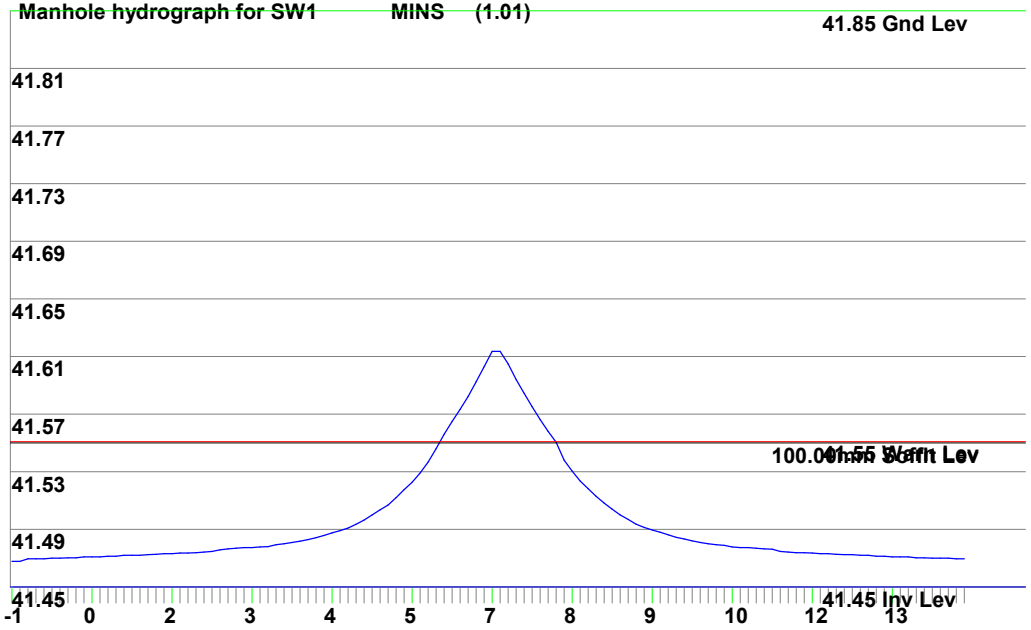
MasterDrain SW

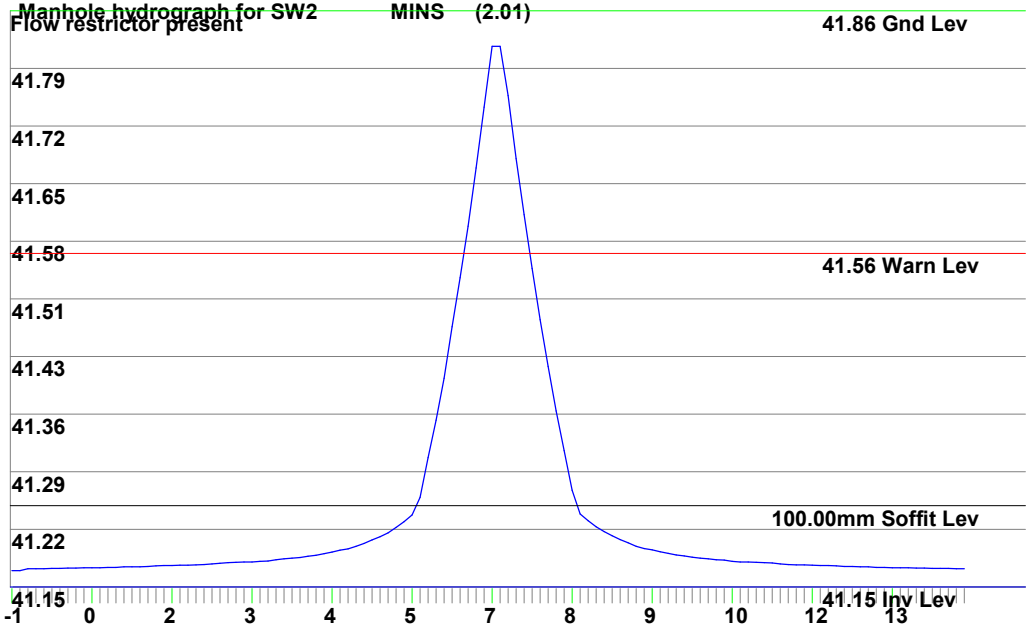
Project: Crescent Place

Title: Surcharge calcs (Sized at 30 yrs storm) for CRESCENT PLACE.SW CCF = 45%









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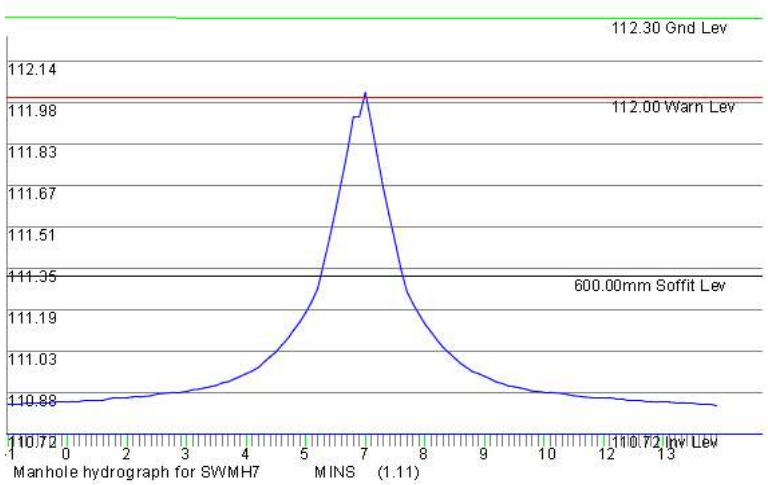
Job No. 940			
Sheet no. 5			
Date 09/10/26			
Project Crescent Place	By XL	Checked	Reviewed
Title Surcharge calcs (Sized at 30 yrs storm) for CRESCENT PLACE.SW CCF = 45%			

.



1) Ground / cover level

2) Warning level - in this case, set at 300mm below cover level.

3) Soffit level of outflow pipe.

4) Invert level of chamber.

Notes

a) Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.

b) Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.

c) The top of the graph clips the warning level and would be marked thus on the printout.

d) In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.

e) The diagram above is a general one and is not part of the current calculation.

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Job No. 940			
Sheet no. 1			
Date 09/10/26			
Project Crescent Place	By XL	Checked	Reviewed
Title Hydrograph storage analysis (Winter profile) for THAKEHAM			

Data:-

FEH Hydrology:-

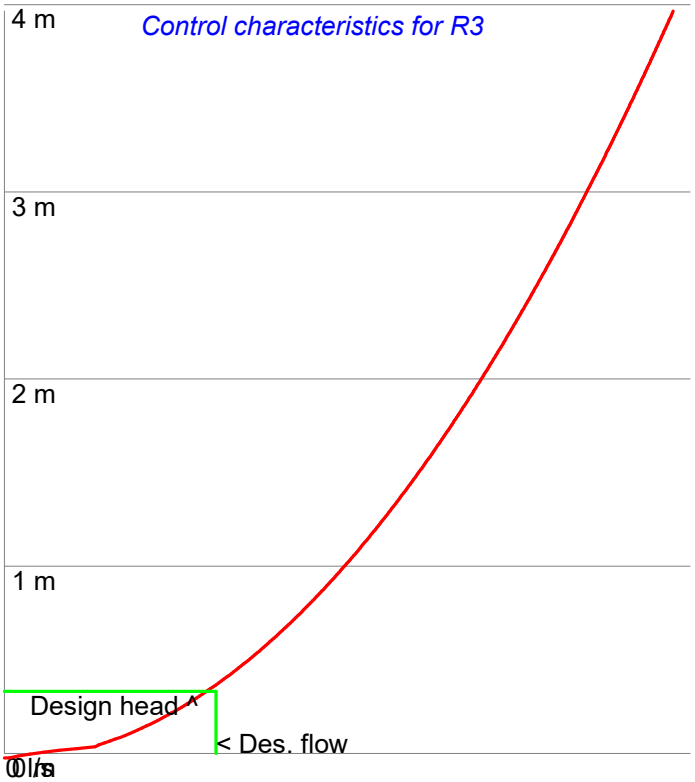
Location = THAKEHAM Grid reference = TQ1017
c = -0.0280 d1 = 0.4192 d2 = 0.2373
d3 = 0.3533 e = 0.3171 f = 2.4211
Return period = 100 Climate change = 45%

Percentage runoff = 95.0% (manual setting)

Imperv. area = 215 m² Pervious area = 0 m²
Total area = 215 m² Equiv area = 204 m² (Tot. area x % runoff).
Total runoff = 17.5 m³ Discharge rate = 2.000 l/s

Design Head = 0.4m Peak flow = 2.00 l/s
Control device = R3 Orifice diam = 49.7 mm
Max. calc. depth = 0.4 m Available depth = 0.0 m³
Mean discharge = 1.29 l/s

Available system storage = 0.00 m³ under a system plane at the design head level.
Offline storage = 0.0 m³
Total storage = 11.0 m³ Peak input flow =6.09 l/s



Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.01	0.05	2.01	4.48
0.05	0.52	2.05	4.53
0.10	1.00	2.10	4.58
0.15	1.22	2.15	4.64
0.20	1.41	2.20	4.69
0.25	1.58	2.25	4.74
0.30	1.73	2.30	4.80
0.35	1.87	2.35	4.85
0.40	2.00	2.40	4.90
0.45	2.12	2.45	4.95
0.50	2.24	2.50	5.00
0.55	2.35	2.55	5.05
0.60	2.45	2.60	5.10
0.65	2.55	2.65	5.15
0.70	2.65	2.70	5.20
0.75	2.74	2.75	5.24
0.80	2.83	2.80	5.29
0.85	2.92	2.85	5.34
0.90	3.00	2.90	5.39
0.95	3.08	2.95	5.43
1.00	3.16	3.00	5.48
1.05	3.24	3.05	5.52
1.10	3.32	3.10	5.57
1.15	3.39	3.15	5.61
1.20	3.46	3.20	5.66
1.25	3.54	3.25	5.70
1.30	3.61	3.30	5.74
1.35	3.67	3.35	5.79
1.40	3.74	3.40	5.83
1.45	3.81	3.45	5.87
1.50	3.87	3.50	5.92
1.55	3.94	3.55	5.96
1.60	4.00	3.60	6.00
1.65	4.06	3.65	6.04
1.70	4.12	3.70	6.08
1.75	4.18	3.75	6.12
1.80	4.24	3.80	6.16
1.85	4.30	3.85	6.20
1.90	4.36	3.90	6.24
1.95	4.42	3.95	6.28
2.00	4.47	4.00	6.32

Calculation data provided by Crown Water Ltd, SL5 7NT

MasterDrain SW

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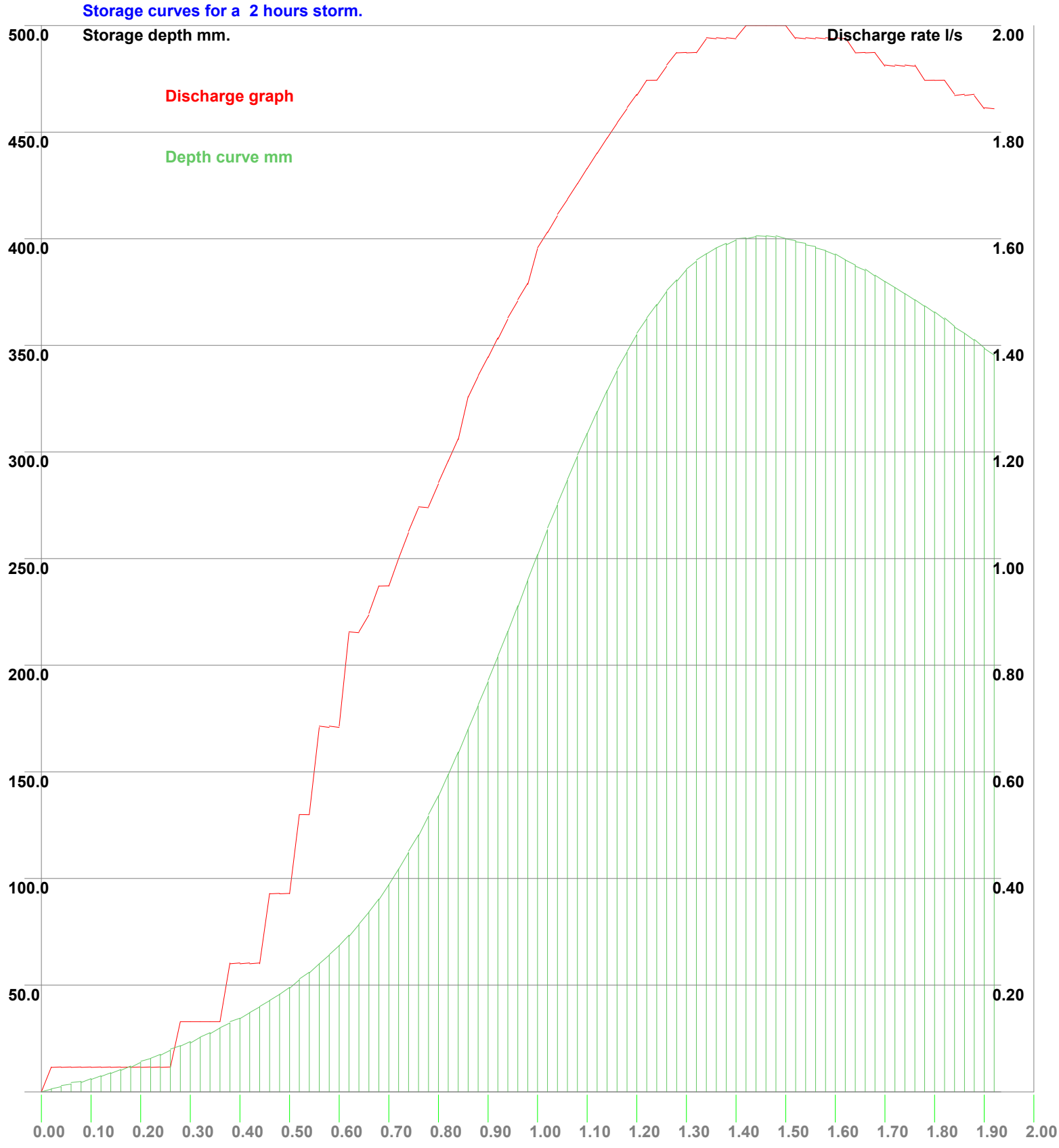
Sheet no. 2			
Date 09/10/26			
Project Crescent Place	By XL	Checked	Reviewed
Title Hydrograph storage analysis (Winter profile) for THAKEHAM			



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940	3	09/10/26	XL		

Project: Crescent Place

Title: Hydrograph storage analysis (Winter profile) for THAKEHAM

Incremental rainfall figures.

Storm Mins	Storage Depth mm	Control Flow l/s	Storm Mins	Storage Depth mm	Control Flow l/s
1.2	1.3	0.05	61.2	263.6	1.61
2.4	2.4	0.05	62.4	275.3	1.64
3.6	3.6	0.05	63.6	286.8	1.67
4.8	4.9	0.05	64.8	297.9	1.70
6.0	6.1	0.05	66.0	308.7	1.73
7.2	7.5	0.05	67.2	319.0	1.76
8.4	8.9	0.05	68.4	328.8	1.79
9.6	10.4	0.05	69.6	338.1	1.82
10.8	12.0	0.05	70.8	346.9	1.84
12.0	13.8	0.05	72.0	355.1	1.87
13.2	15.6	0.05	73.2	362.5	1.90
14.4	17.5	0.05	74.4	369.2	1.90
15.6	19.5	0.05	75.6	375.3	1.92
16.8	21.6	0.13	76.8	380.7	1.95
18.0	23.5	0.13	78.0	385.4	1.95
19.2	25.6	0.13	79.2	389.4	1.95
20.4	27.7	0.13	80.4	392.9	1.97
21.6	29.9	0.13	81.6	395.7	1.97
22.8	32.3	0.24	82.8	397.8	1.97
24.0	34.5	0.24	84.0	399.4	1.97
25.2	37.0	0.24	85.2	400.4	2.00
26.4	39.7	0.24	86.4	401.0	2.00
27.6	42.7	0.37	87.6	401.1	2.00
28.8	45.7	0.37	88.8	400.8	2.00
30.0	49.0	0.37	90.0	400.1	2.00
31.2	52.5	0.52	91.2	399.0	1.97
32.4	56.1	0.52	92.4	397.8	1.97
33.6	60.1	0.68	93.6	396.3	1.97
34.8	64.1	0.68	94.8	394.5	1.97
36.0	68.5	0.68	96.0	392.5	1.97
37.2	73.4	0.86	97.2	390.2	1.97
38.4	78.4	0.86	98.4	387.7	1.95
39.6	84.2	0.89	99.6	385.1	1.95
40.8	90.4	0.95	100.8	382.5	1.95
42.0	97.1	0.95	102.0	379.8	1.92
43.2	104.4	1.00	103.2	377.1	1.92
44.4	112.2	1.05	104.4	374.2	1.92
45.6	120.5	1.10	105.6	371.3	1.92
46.8	129.3	1.10	106.8	368.3	1.90
48.0	138.8	1.14	108.0	365.3	1.90
49.2	148.8	1.18	109.2	362.2	1.90
50.4	159.3	1.22	110.4	358.9	1.87
51.6	170.0	1.30	111.6	355.7	1.87
52.8	181.0	1.34	112.8	352.3	1.87
54.0	192.3	1.38	114.0	348.9	1.84
55.2	204.0	1.41	115.2	345.4	1.84
56.4	215.8	1.45	116.4	342.0	1.84
57.6	227.8	1.48	117.6	338.5	1.82
58.8	239.8	1.52	118.8	335.0	1.82
60.0	251.8	1.58	120.0	331.5	1.82

Using the Get Max button causes the program to step through a series of storm durations until a maximum volume is obtained.
Each duration is sampled 600 times and the results recorded. The storm durations (hrs) are:-

0.25, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 42, 48, 54, 60, 66, 72, 84, 96, 120, 150, 175, 200, 250, 300, 375, 500, 750, 1000, 1250, 1500, 1570, 2000, 2500, 3000, 3500, 4000

It should be noted that the six hour storm frequently requested rarely demonstrates the worst case for storage.

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Sheet no.	4
Date	09/10/26
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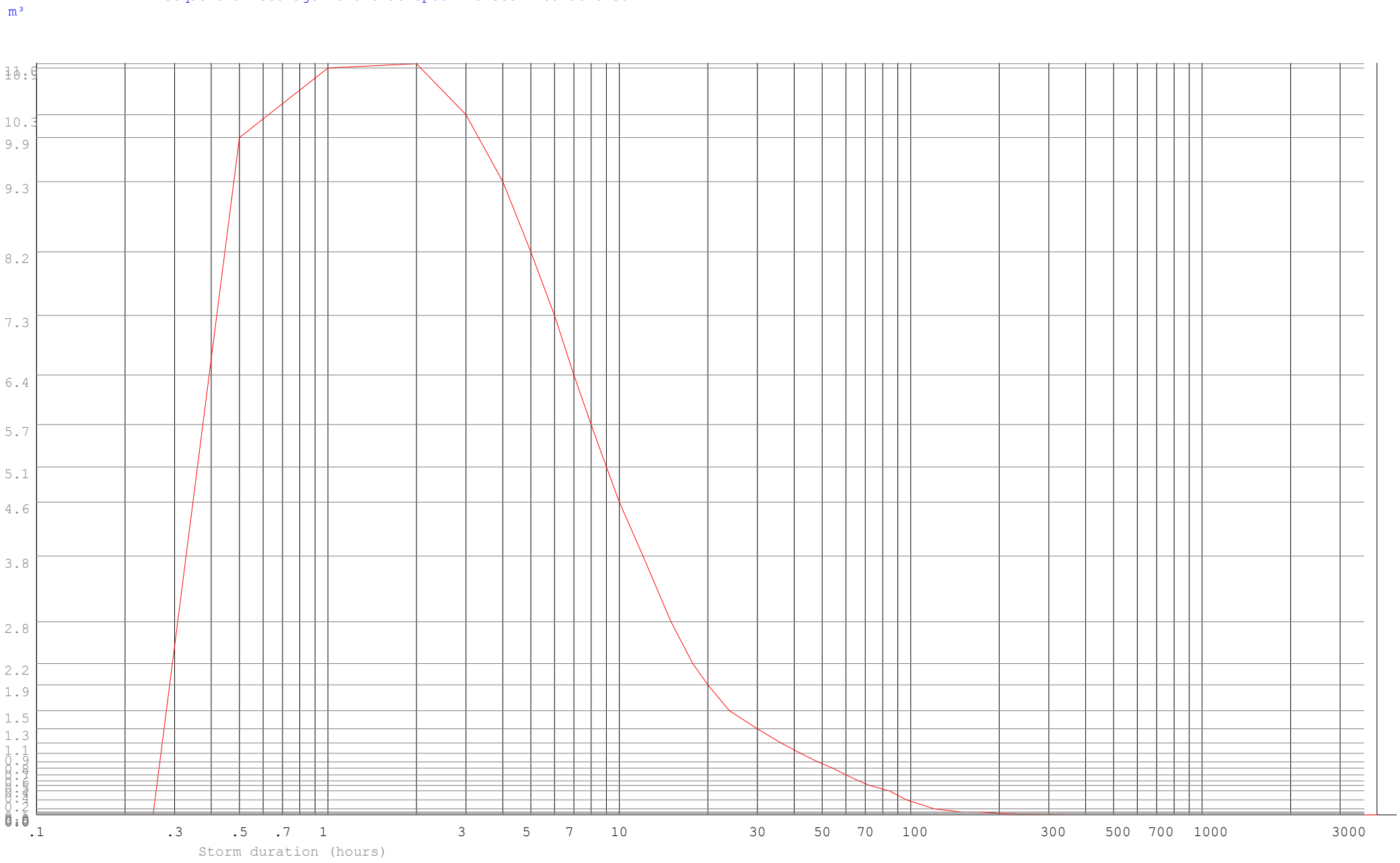
MasterDrain SW

Project: Crescent Place

Title: Hydrograph storage analysis (Winter profile) for THAKEHAM

Sequential storage volume at specific storm durations.



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Sheet no. 1			
Date 09/10/26 11:34			
Project Crescent Place	By XL	Checked	Reviewed
Title Manhole printout for CRESCENT PLACE.SW			

Manhole ref.	X ref	Y ref	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Exit Diam	Exit Crown	Exit Invert	Chamb const	Slab level	Cover Level	Dwnstr MH
SW1	46.16	23.61	circ	450	N/A	0.50		0.08	100	42.385	42.260	N/A	42.210	42.760	tenuation
SW2	38.65	42.87	circ	450	N/A	0.30		0.05	100	41.875	41.750	N/A	41.700	42.050	tenuation
Attenuation	36.14	39.97	circ	1200	N/A	0.40		0.45	100	41.575	41.450	N/A	41.400	41.850	SW3
SW3	41.02	37.46	circ	450	N/A	0.71		0.11	100	41.275	41.150	N/A	41.100	41.860	Stream

All manholes to be as per 'Sewers for Adoption'

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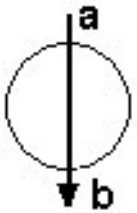
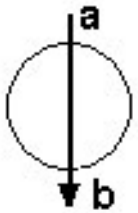
Sheet no.	2
Date	09/10/26 11:34

Project	By	Checked	Reviewed
Crescent Place	XL		

Title: **Manhole printout for CRESCENT PLACE.SW**

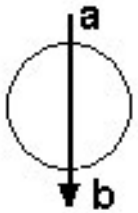


MH = SW1
a=head
b = 100



MH = SW2
a=head
b = 100

MH = Attenuation
a= 100
b = 100
c = 100
d = 100



MH = SW3
a= 100
b = 100

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Sheet no. 3			
Date 09/10/26 11:34			
Project Crescent Place	By XL	Checked	Reviewed
Title Manhole printout for CRESCENT PLACE.SW			

These explanatory notes should be read in conjunction with the Manhole printout

1) Manhole ref - the reference for the manhole in question
2) Form - either circular or rectangular
3) Chamber diam or length - diameter of chamber if circular, or length if rectangular - in metres
4) Rectangular width - if form is rectangular, this gives the width of the chamber
5) Chamber height - height of chamber from invert
6) Shaft height - height of access shaft if applicable, from top of chamber to ground level
7) Manhole volume - cubic capacity of manhole chamber
8) Exit diameter - diameter of pipe leaving this manhole
9) Exit crown - crown level of pipe leaving this manhole
10) Exit invert - invert level of pipe leaving this manhole
11) Chamb const - manhole construction :-
    N/A - not specified
    Conc - concrete rings
    Poly - polypropylene rings surrounded by selected fill
    Poly/conc - polypropylene rings surrounded by concrete
    Brick - brick built with waterproof render
    In situ - concrete cast in situ
12) Slab level - surface level of base slab (if no sump, this is placed at 50mm below exit invert to allow levels manipulation).
13) Manhole diameters of 9999 have exceeded the sizes available in SfA
14) Manhole diameters may have to be modified due to the number of branches

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MasterDrain
Foul 11.5

Job No.	940
Sheet no.	0
Date	09/10/26
Project	Crescent Place
Title	Manhole printout for CRESCENT PLACE, THAKEHAM.FL
By	XL
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Manhole ref.	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Ent. Diam	Ent. Crown	Ent. Invert	Exit Diam	Exit Crown	Exit Invert	Chamb const	Cover Level	Dwnstr MH
FW1	circ	450	N/A	0.50		0.08	Head	----	----	100	42.055	41.930	N/A	42.430	0202

All manholes to be as per 'Sewers for Adoption'

Levels calculated for level inverts

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Date	09/10/26
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Foul 11.5

Project Crescent Place

Title Manhole printout for CRESCENT PLACE, THAKEHAM.FL

These explanatory notes should be read in conjunction with the Manhole printout

1) Manhole ref - the reference for the manhole in question

2) Form - either circular or rectangular

3) Chamber diam or length - diameter of chamber if circular, or length if rectangular - in metres

4) Rectangular width - if form is rectangular, this gives the width of the chamber

5) Chamber height - height of chamber from invert

6) Shaft height - height of access shaft if applicable, from top of chamber to ground level

7) Manhole volume - cubic capacity of manhole chamber

8) Exit diameter - diameter of pipe leaving this manhole

9) Exit crown - crown level of pipe leaving this manhole

10) Exit invert - invert level of pipe leaving this manhole

11) Manhole diameters of 9999 have exceeded the sizes available in SfA

12) Manhole diameters may have to be modified due to the number of branches

APPENDIX E:

PHOTOGRAPHS

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Location of proposed dwelling





Existing house



Easternmost bridge crossing the ditch running east to west



© Environmental Assessment Services Limited

Central bridge crossing the ditch running east to west and ditch





Ditch running north to south and culvert





Bridge on the ditch to the rear of the existing dwelling



© Environmental Assessment Services Limited

Ditch on the far side of Storrington Road



Foul water manhole (CH 0202) in Storrington Road

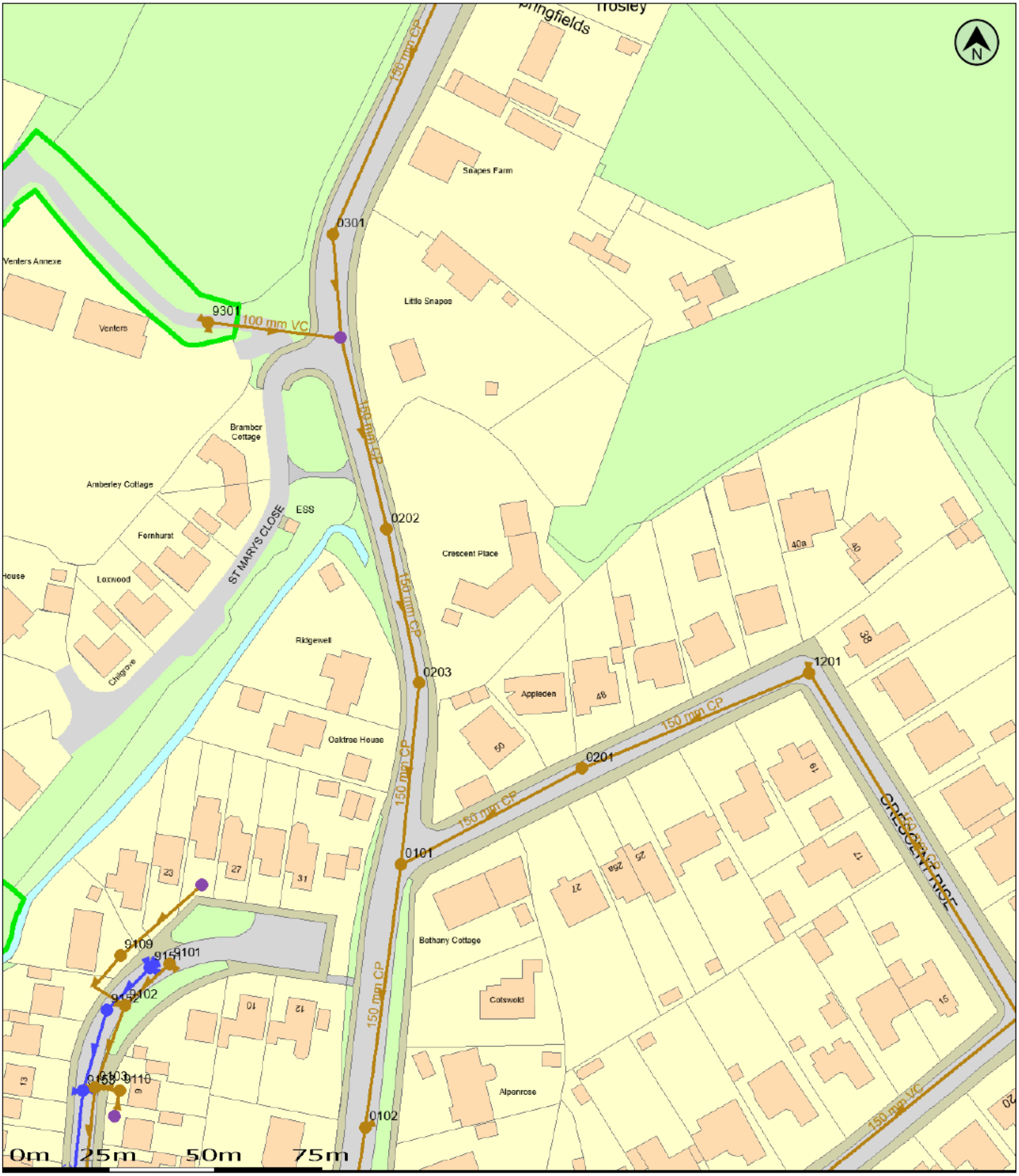


© Environmental Assessment Services Limited

APPENDIX F

SOUTHERN WATER SEWER PLANS

© Environmental Assessment Services Limited



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Scale: 1:1250

Date: 07/10/26

Wastewater Plan A4

Data updated: 18/09/26

Map Centre: 510068,115247

Our Ref: 2228690 - 1

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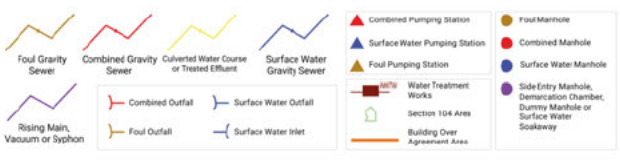


malcolm@easltd.co.uk

Crescent Place

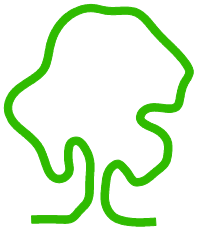
WATER forLIFE from Southern Water

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2026 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0101	F	41.96	39.70	
0102	F	42.46	39.35	
0201	F	42.88	41.21	
0202	F	41.55	40.13	
0203	F	41.56	39.95	
0301	F	0.00	0.00	
1201	F	43.93	42.19	
9101	F	48.50	46.59	
9102	F	0.00	0.00	
9103	F	48.28	46.15	
9109	F	0.00	0.00	
9110	F	0.00	0.00	
9301	F	42.88	42.22	
9151	S	48.46	47.09	
9152	S	48.36	46.96	
9153	S	48.27	46.87	



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