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28 NICHOLAS WAY

NORTHWOOD

HA6 2TT

DRAINAGE STRATEGY REPORT INCLUDING MANAGEMENT AND MAINTENANCE REQUIREMENTS

Contents

Document Control

Revision	Purpose	Date	By	Approved
-	Initial issue	06/01/2023	MJ	JOD

Prepared By: MJ

Approved By: JOD

Project No.	**22-254**	**Revision**	-	**Date**	06/01/2023

1 INTRODUCTION

1.1.1 Hodel Ltd. has been appointed to produce a strategy for below ground foul and surface water drainage for the proposed development at 28 Nicholas Way, Northwood.

1.1.2 This report outlines the proposed drainage strategy and has been written in accordance with the requirements of the National Planning Policy Framework.

2 EXISTING SITE

2.1.1 The 4064m^2 site has one dwelling, garden area and shared driveway also used to access numbers 26 & 26A. It is located within Flood Zone 1 with a low probability of flooding as defined by the Environment Agency (EA) on their Flood Map for Planning.

2.1.2 For the purposes of this report the area of the shared driveway, approximately equal to 432m^2, has been discounted from all figures as there are no planned works in this area. The remaining site area is therefore 3632m^2.

2.1.3 The existing impermeable area is approximately 776m^2, approximately 21% of the total site.

2.1.4 The British National Grid reference is E:508129, N:190732. It is bounded by residential properties and gardens in all directions with a shared access road to the east to Nicholas Way.

2.1.5 The general topography of the site is a fall from the northwest to the southeast with a plateau around the existing property.

2.2 Geology

2.2.1 The British Geological Survey (BGS) indicates that the site is underlain by London Clay with no superficial deposits mapped.

2.3 Surface Water & Groundwater

2.3.1 HM Government's map for Flood Risk from Rivers or Sea indicates that the site is at very low risk of flooding from Rivers or Sea.

2.3.2 HM Government's Surface Water Flood map indicates that the site is at very low risk of flooding.

2.3.3 DEFRA's Groundwater Source Protection Zone map indicates that the site is in a Zone 3 – Total Catchment source protection zone.

2.3.4 DEFRA's Groundwater Vulnerability Zone map indicates that the site is in an unproductive vulnerability zone.

2.4 Existing Surface Water Strategy

2.4.1 Surface water generated onsite currently discharges to the sewer in the access road from Nicholas Road at an unrestricted rate.

2.5 Existing Foul Water Strategy

2.5.1 The foul water from the existing property discharges to the sewer in the access road from Nicholas Road.

3 PROPOSED SITE

3.1.1 The proposal is to demolish and replace the existing dwelling.

3.1.2 The proposed impermeable area is approximately 561m^2, approximately 15% of the site, which is a decrease of 215m^2; the drained areas drawing is annexed to this report.

3.2 Proposed Surface Water Strategy

3.2.1 As per CIRIA C753, the options for controlling water at source have been assessed as per the SuDS hierarchy. The site underlaid by London Clay which is known to have limited infiltration capacity, therefore soakaways are deemed unsuitable. The driveway and hardstanding areas are to be of permeable construction draining their own areas, this is to be confirmed by onsite BRE365 infiltration testing.

Table 1 – SuDS Hierarchy

Hierarchy Preference		Surface Water Discharge Location	Appropriate	Notes
1	Attenuation and gradual release	Re-use rainwater for non-potable water supply.	✓	Rainwater can be stored in water butts for future use in garden area.
2		Discharge through infiltration techniques.	✓	Limited viability, possibly suitable for permeable paving only.
3		Attenuate in ponds or open water features for gradual release.	×	Unsuitable due to tree and site level constraints
4		Attenuate by storing in tanks or sealed water features for gradual release.	✓	
5	Discharge to watercourse	Discharge direct to a watercourse.	×	No access to watercourse onsite.
6	Discharge to sewerage network	Discharge to a surface water sewer/drain.	✓	Surface water sewer in road.
7		Discharge to a local highways drain.	×	
8		Discharge to a combined sewer.	×	

3.2.2 Surface water generated on roof areas is the be collected via traditional methods in a below ground attenuation tank before discharging to the surface water sewer at a restricted rate.

3.2.3 The existing site runoff rate for the site has been calculated for the 1 in 1, 10, 30 & 100 year events to be 6.8, 13.2, 16.7 & 21.7l/s respectively. The greenfield runoff for the site has been calculated to be 1.65l/s (QBar), it is therefore proposed to discharge surface water at a rate of 1.6l/s, to closely match the greenfield rate for all events up to and including the 1 in 100 year event with a 40% allowance for climate change.

3.2.4 The attenuation tank has been sized to contain the 1 in 100 year event with a 40% allowance for climate change with a peak discharge of 1.6l/s.

3.2.5 If it is found the infiltration rate is not sufficient for permeable paving, the hardstanding shall be positively drained to the attenuation tank whilst maintaining the restricted discharge rate to the sewer of 1.6l/s. To allow for the hardstanding, the attenuation tank would need to increase by approximately 20.8m^3.

3.2.6 Catchpits and gullies have been specified to mitigate the risk of pollutants entering the network, these are to be maintained as per the maintenance

schedule. The permeable paving construction shall act as a filter to prevent pollutants infiltrating to ground.

Calculations and results derived from MicroDrainage, can be found in Appendix 6.3 and pre and post development site discharge rates are in Appendix 6.4

3.3 Proposed Foul Water Strategy

3.3.1 It is proposed to continue discharging foul water to the sewer via the existing connection.

4 MANAGEMENT AND MAINTENANCE REQUIREMENTS

4.1.1 The pipework for all drainage systems is to be designed to be self-cleansing and as such should require no regular maintenance. If a blockage occurs, the system will be detailed so that easy rodding or jetting can take place.

4.1.2 Drainage that requires regular maintenance or after any large-scale rainfall event is detailed in Table 2.

Table 2 - Drainage Maintenance

Drainage Feature	Inspection Frequency / Requirement	Maintenance Requirement	Responsibility
Gullies	Every 6 months, for silt and debris.	Silt and debris to be cleared from gully pots.	Homeowner
Gutters	Every 12 months, for silt and debris.	Silt and debris to be cleared from gutters.	Homeowner
Rainwater Downpipes	Every 12 months, for silt and leaves.	Silt to be cleared from gully pot, leaves to be cleared from gutters and downpipes.	Homeowner
Catchpits & Sumps	Every 6 months, for silt, debris or other obstructions.	Silt and debris or obstructions to be cleared from catchpit chambers.	Homeowner
Pipework	If a problem occurs, by CCTV surveys	As recommended by CCTV survey company.	Homeowner
Permeable Paving	As per manufacturer recommendations.	As per manufacturer recommendations.	Homeowner

5 CONCLUSION

5.1.1 The hardstanding is to be of permeable construction and as such self-draining. Surface water from the roof area is to be attenuated below ground prior to discharging to the surface water sewer at a restricted rate of 1.6l/s for all events up to and including the 1 in 100 year event with a 40% allowance for climate change. The network has been sized to contain the 1 in 100 year event with a 40% allowance for climate change with no flooding from the network.

There shall be no increase to risk of flooding on or off site.

5.1.2 The foul water shall continue to discharge to the foul sewer via the existing connection.

5.1.3 Ongoing maintenance will be required for the surface water drainage, as detailed in the above Table 2.

6 APPENDICES

6.1 Engineering Layout

6.2 Drained Areas Analysis Sketch

6.3 MicroDrainage Calculations and Results

6.4 Site Discharge Rates

6.5 Rainfall Profiles

6.6 Flood Risk from Rivers or Sea

6.7 Flood Risk from Surface Water

6.8 Groundwater Source Protection

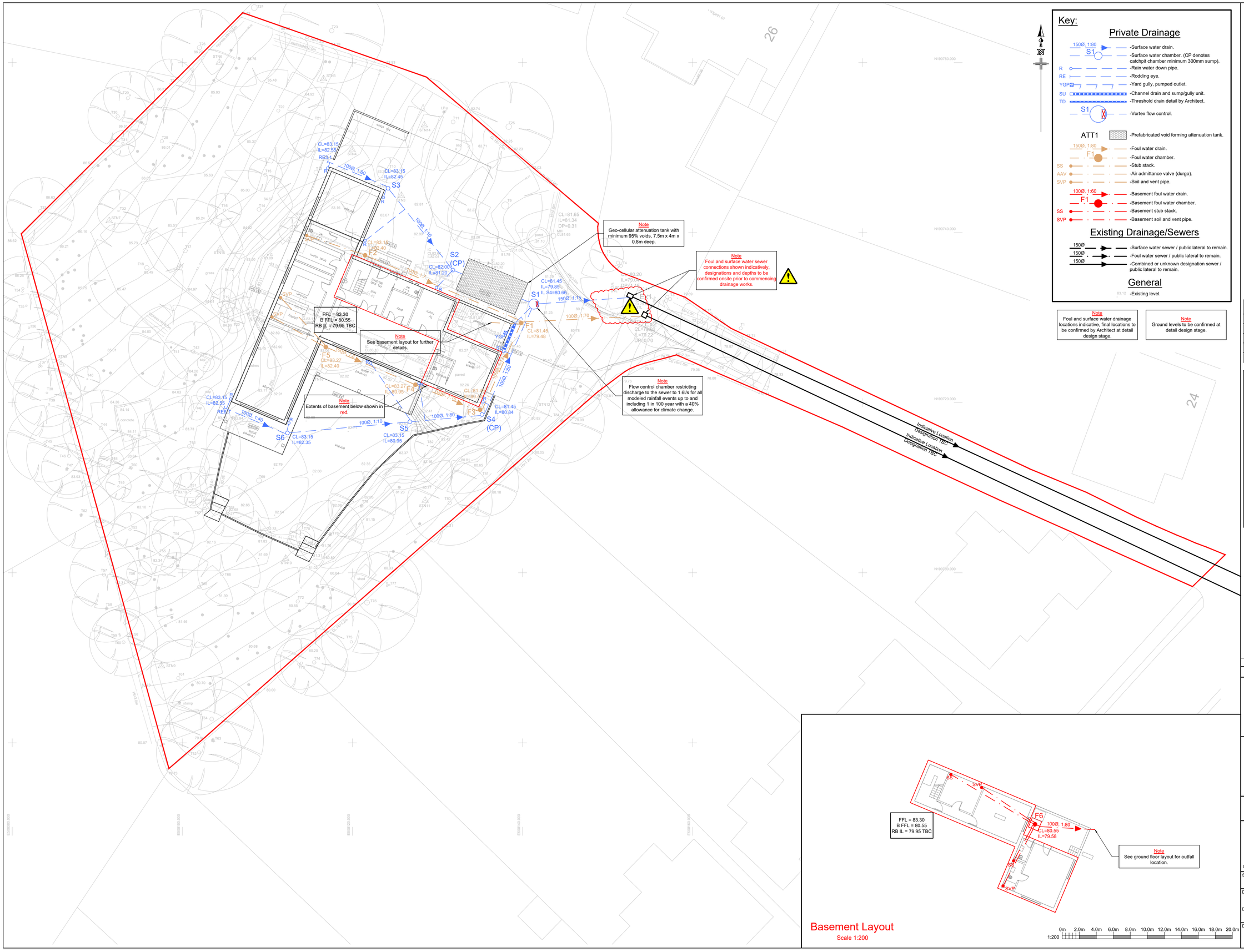
6.9 Groundwater Vulnerability

6.10 Flood Map for Planning

6.11 Greenfield Runoff Rate

6.12 Thames Water Sewer Records

APPENDIX 6.1 ENGINEERING LAYOUT



Key:

Private Drainage

- 150Ø, 1:80 / S1 — -Surface water drain.
- S1 — -Surface water chamber. (CP denotes catchpit chamber minimum 300mm sump).
- R — -Rain water down pipe.
- RE — -Rodding eye.
- YGP — -Yard gully, pumped outlet.
- SU — -Channel drain and sump/gully unit.
- TD — -Threshold drain detail by Architect.
- S1 / V — -Vortex flow control.
- ATT1 — -Prefabricated void forming attenuation tank.
- 150Ø, 1:80 / F1 — -Foul water drain.
- F1 — -Foul water chamber.
- SS — -Stub stack.
- AAV — -Air admittance valve (durgo).
- SVP — -Soil and vent pipe.
- 100Ø, 1:60 / F1 — -Basement foul water drain.
- F1 — -Basement foul water chamber.
- SS — -Basement stub stack.
- SVP — -Basement soil and vent pipe.

Existing Drainage/Sewers

- 150Ø — -Surface water sewer / public lateral to remain.
- 150Ø — -Foul water sewer / public lateral to remain.
- 150Ø — -Combined or unknown designation sewer / public lateral to remain.

General

83.12 -Existing level.

Note
Foul and surface water drainage locations indicative, final locations to be confirmed by Architect at detail design stage.

Note
Ground levels to be confirmed at detail design stage.

NOTES

1. Do not scale this drawing.
2. This drawing is to be read in conjunction with all other relevant Engineer's and Architect's drawings and specifications.

Drawings References:

Drawing:	Drawing no:	Rev:	Date:
Topographical Survey	3503 01		May '07
Site Plan	375 001	0	04/07/22

RISK ASSESSMENT

Residual Risks Identified

1. Details of existing chambers to be investigated, including depths and designations, 05/01/23.

Contractor's General Risk Items

(List is not exhaustive but includes commonly raised issues)

1. Location of all buried services.
2. Existing drainage:
   i) Gases, confined spaces, diseases.
   ii) Maintain flow in drains during works.
3. Manual lifting of heavy objects; manhole covers, drainage pipes, concrete rings, kerbs,etc.
4. Excavation for drainage trenches and manholes.
5. Security:
   Keep site secure from members of the public.
   maintain public safety when accessing site.

Basement Layout

Scale 1:200

0m 2.0m 4.0m 6.0m 8.0m 10.0m 12.0m 14.0m 16.0m 18.0m 20.0m
1:200

Rev	Date	By	Chkd.	Revision notes
-	06/01/23	MJ	JOD	Issued for scheme purposes.

Job Title

28 Nicholas Way
Northwood
HA6 2TT

Drawing Title

Engineering Layout

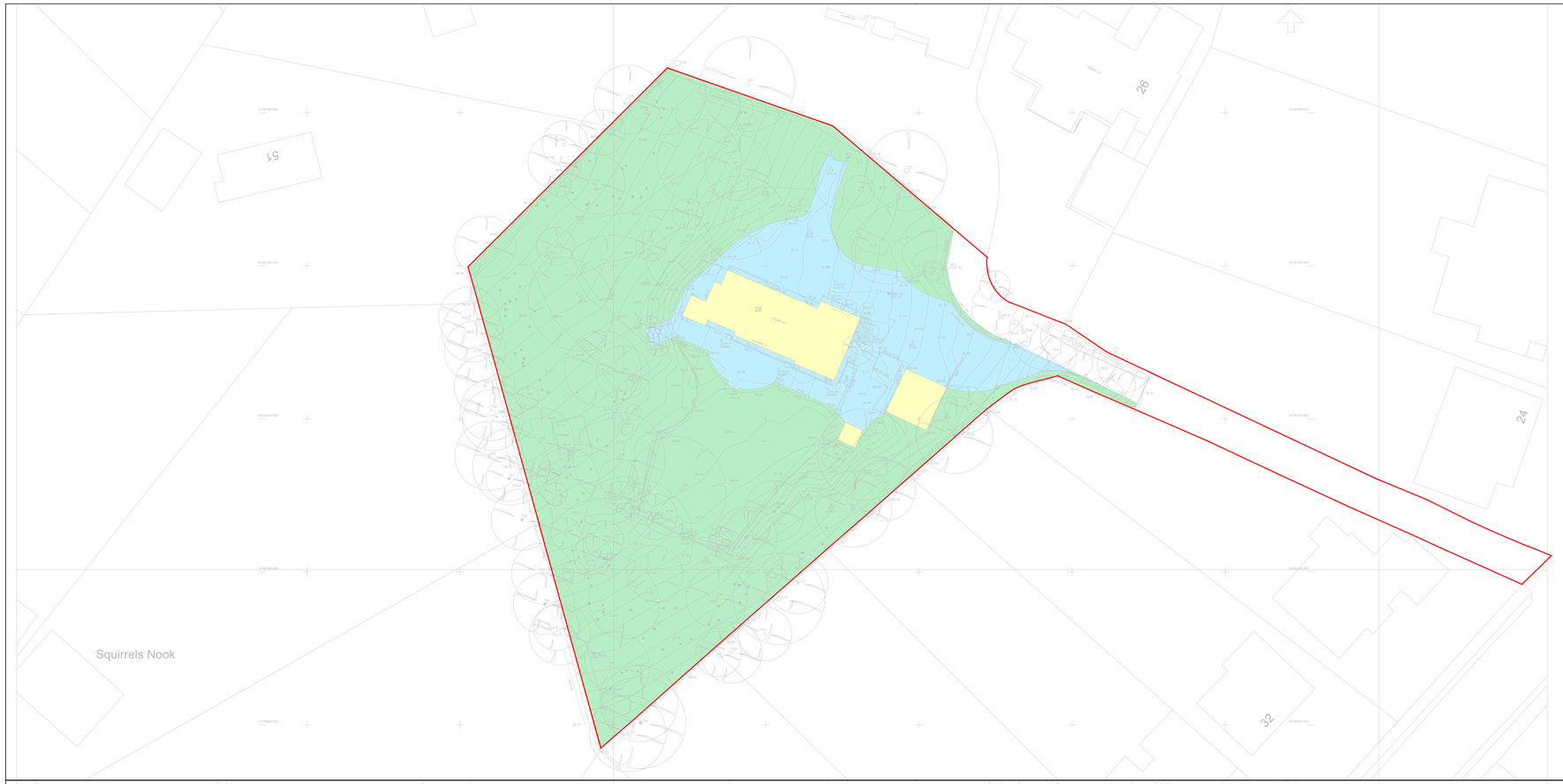
Client

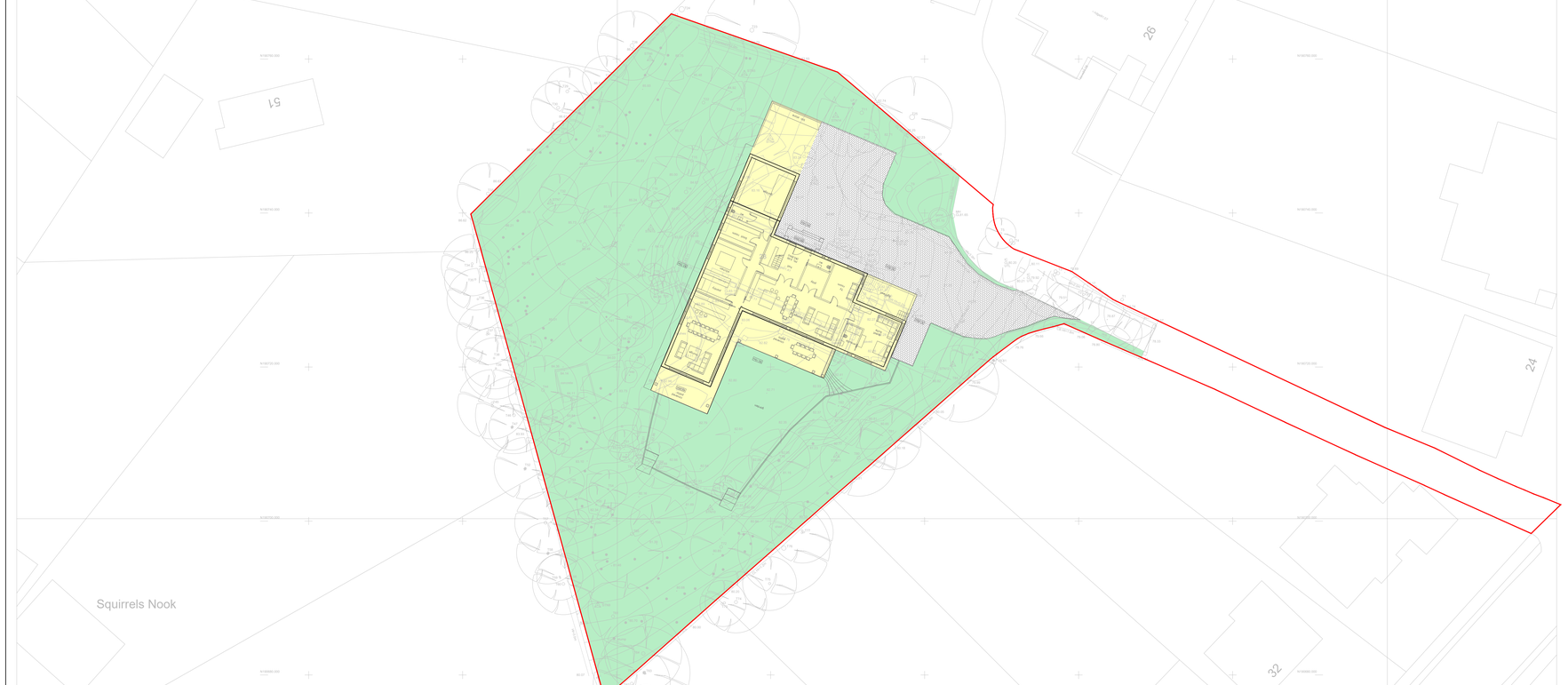
Mr & Mrs Maroo

HODEL CONSULTING ENGINEERS
01732 617555
mail@hodel.uk

Scale at A1:	Status:	
1:200	SCHEME PURPOSES ONLY	
Drawn: MJ Date: Jan '23	Checked: JOD Date: Jan '23	Approved: - Date: xxx
Drawing No.: 22-254_C01		Revision: -

APPENDIX 6.2 DRAINED AREAS ANALYSIS SKETCH





Areas Key:

Pre Development Areas

Soft Landscaping Area =	2856m²
Hardstanding Area =	577m²
Building Roof Area =	199m²
Shared Driveway Area = (Excluded from calculations)	432m²
Total Impermeable Area =	776m²
Total Area =	4064m²

Post Development Areas

Soft Landscaping Area =	2623m²
Hardstanding Area = (Permeable)	448m²
Building Roof Area =	561m²
Shared Driveway Area = (Excluded from calculations)	432m²
Total Impermeable Area =	561m²
Total Area =	4064m²

0m 2.5m 5.0m 7.5m 10.0m 12.5m 15.0m 17.5m 20.0m 22.5m 25.0m
1:250

NOTES

1. Do Not scale this drawing.
2. This drawing to be read in conjunction with all other relevant Engineer's and Architect's drawings and specifications.

Rev	Date	By	Chkd.	Revision notes
-	06/01/23	AG	JOD	Issued for scheme purposes.

Job Title

28 Nicholas Way
Northwood
HA6 2TT

Drawing Title

Drained Areas Sketch

Client

Mr & Mrs Maroo

HODEL CONSULTING ENGINEERS
01732 617555 mail@hodel.uk

Scale at A0: 1:250	Status: SCHEME PURPOSES ONLY	
Drawn: AG Date: Jan '23	Checked: JOD Date: Jan '23	Approved: - Date:
Drawing No.: 22-254_SKC01		Revision: -

APPENDIX 6.3 MICRODRAINAGE CALCULATIONS AND RESULTS

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

Half Drain Time : 133 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.567	0.467	0.0	1.6	1.6	13.3	O K
30 min Summer	8.683	0.583	0.0	1.6	1.6	16.6	O K
60 min Summer	8.758	0.658	0.0	1.6	1.6	18.7	O K
120 min Summer	8.754	0.654	0.0	1.6	1.6	18.6	O K
180 min Summer	8.721	0.621	0.0	1.6	1.6	17.7	O K
240 min Summer	8.690	0.590	0.0	1.6	1.6	16.8	O K
360 min Summer	8.631	0.531	0.0	1.6	1.6	15.1	O K
480 min Summer	8.573	0.473	0.0	1.6	1.6	13.5	O K
600 min Summer	8.506	0.406	0.0	1.6	1.6	11.6	O K
720 min Summer	8.445	0.345	0.0	1.6	1.6	9.8	O K
960 min Summer	8.345	0.245	0.0	1.6	1.6	7.0	O K
1440 min Summer	8.212	0.112	0.0	1.5	1.5	3.2	O K
2160 min Summer	8.121	0.021	0.0	1.4	1.4	0.6	O K
2880 min Summer	8.100	0.000	0.0	1.2	1.2	0.0	O K
4320 min Summer	8.100	0.000	0.0	0.9	0.9	0.0	O K
5760 min Summer	8.100	0.000	0.0	0.7	0.7	0.0	O K
7200 min Summer	8.100	0.000	0.0	0.6	0.6	0.0	O K
8640 min Summer	8.100	0.000	0.0	0.5	0.5	0.0	O K
10080 min Summer	8.100	0.000	0.0	0.4	0.4	0.0	O K
15 min Winter	8.630	0.530	0.0	1.6	1.6	15.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	141.236	0.0	14.8	18
30 min Summer	92.203	0.0	19.3	32
60 min Summer	57.296	0.0	24.0	62
120 min Summer	34.389	0.0	28.9	110
180 min Summer	25.173	0.0	31.7	142
240 min Summer	20.057	0.0	33.7	174
360 min Summer	14.527	0.0	36.6	244
480 min Summer	11.553	0.0	38.8	314
600 min Summer	9.666	0.0	40.5	378
720 min Summer	8.351	0.0	42.1	438
960 min Summer	6.626	0.0	44.5	558
1440 min Summer	4.775	0.0	48.1	782
2160 min Summer	3.436	0.0	52.0	1124
2880 min Summer	2.718	0.0	54.8	0
4320 min Summer	1.951	0.0	59.0	0
5760 min Summer	1.540	0.0	62.1	0
7200 min Summer	1.281	0.0	64.6	0
8640 min Summer	1.102	0.0	66.7	0
10080 min Summer	0.970	0.0	68.5	0
15 min Winter	141.236	0.0	16.6	18

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.765	0.665	0.0	1.6	1.6	18.9	O K
60 min Winter	8.860	0.760	0.0	1.6	1.6	21.6	O K
120 min Winter	8.876	0.776	0.0	1.6	1.6	22.1	O K
180 min Winter	8.831	0.731	0.0	1.6	1.6	20.8	O K
240 min Winter	8.788	0.688	0.0	1.6	1.6	19.6	O K
360 min Winter	8.705	0.605	0.0	1.6	1.6	17.2	O K
480 min Winter	8.619	0.519	0.0	1.6	1.6	14.8	O K
600 min Winter	8.520	0.420	0.0	1.6	1.6	12.0	O K
720 min Winter	8.424	0.324	0.0	1.6	1.6	9.2	O K
960 min Winter	8.282	0.182	0.0	1.6	1.6	5.2	O K
1440 min Winter	8.135	0.035	0.0	1.4	1.4	1.0	O K
2160 min Winter	8.100	0.000	0.0	1.1	1.1	0.0	O K
2880 min Winter	8.100	0.000	0.0	0.9	0.9	0.0	O K
4320 min Winter	8.100	0.000	0.0	0.6	0.6	0.0	O K
5760 min Winter	8.100	0.000	0.0	0.5	0.5	0.0	O K
7200 min Winter	8.100	0.000	0.0	0.4	0.4	0.0	O K
8640 min Winter	8.100	0.000	0.0	0.4	0.4	0.0	O K
10080 min Winter	8.100	0.000	0.0	0.3	0.3	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	92.203	0.0	21.7	32
60 min Winter	57.296	0.0	26.9	60
120 min Winter	34.389	0.0	32.3	116
180 min Winter	25.173	0.0	35.5	148
240 min Winter	20.057	0.0	37.7	186
360 min Winter	14.527	0.0	41.0	264
480 min Winter	11.553	0.0	43.5	340
600 min Winter	9.666	0.0	45.4	410
720 min Winter	8.351	0.0	47.2	468
960 min Winter	6.626	0.0	49.9	578
1440 min Winter	4.775	0.0	53.9	782
2160 min Winter	3.436	0.0	58.2	0
2880 min Winter	2.718	0.0	61.4	0
4320 min Winter	1.951	0.0	66.1	0
5760 min Winter	1.540	0.0	69.5	0
7200 min Winter	1.281	0.0	72.3	0
8640 min Winter	1.102	0.0	74.7	0
10080 min Winter	0.970	0.0	76.7	0

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.200	Shortest Storm (mins)	15
Ratio R	0.413	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.056

Time (mins) From:	To:	Area (ha)
0	4	0.056

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	30.0	30.0	0.801	0.0	48.4
0.800	30.0	48.4			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0061-1600-0900-1600
Design Head (m)	0.900
Design Flow (l/s)	1.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	61
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	1.6
Flush-Flo™	0.270	1.6
Kick-Flo®	0.546	1.3
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	1.8	3.000	2.8	7.000	4.1
0.200	1.5	1.400	1.9	3.500	3.0	7.500	4.2
0.300	1.6	1.600	2.1	4.000	3.2	8.000	4.4
0.400	1.5	1.800	2.2	4.500	3.3	8.500	4.5
0.500	1.4	2.000	2.3	5.000	3.5	9.000	4.6
0.600	1.3	2.200	2.4	5.500	3.7	9.500	4.7
0.800	1.5	2.400	2.5	6.000	3.8		
1.000	1.7	2.600	2.6	6.500	4.0		

APPENDIX 6.4 SITE DISCHARGE RATES

SITE AREAS
& DISCHARGE RATES

HODEL CONSULTING ENGINEERS
The Gatehouse | Bays 2&3 Pattenden Lane
Marden | Tonbridge | Kent | TN12 9QS
Tel: 01732 617555
Email: mail@hodel.uk

Project No:	**22-254**	Sheet No.	**Areas**
Made By:	**MJ**	Revision:	**-**
Date:	**06/01/2023**	Project:	**28 Nicholas Way**

Total Site Area: 3632 m^2

Existing

				Impermeable Hardstanding	*577* m^2
Permeable:	2856	m^2	78.6 %	*Permeable Hardstanding*	*0* m^2
Impermeable:	776	m^2	21.4 %	*Roof's*	*199* m^2
Total:	3632	m^2		*Soft Landscaping*	*2856* m^2

Proposed

				Impermeable Hardstanding	*0* m^2
Permeable:	3071	m^2	84.6 %	*Permeable Hardstanding*	*448* m^2
Impermeable:	561	m^2	15.4 %	*Roof's*	*561* m^2
Total:	3632	m^2		*Soft Landscaping*	*2623* m^2

Therefore there is **a reduction** in impermeable area by: **27.7** %

Storm Water Discharge calculations *(Data Obtained from Microdrainage rainfall profiles based on 15min storm duration average intensity)*

1 Year Return Period Rainfall	31.6 mm/hr
10 Year Return Period Rainfall	61.2 mm/hr
30 Year Return Period Rainfall	77.7 mm/hr
100 Year Return Period Rainfall	100.9 mm/hr
100 Year Return Period Rainfall (plus 20% climate change)	121.1 mm/hr
100 Year Return Period Rainfall (plus 40% climate change)	141.2 mm/hr

Unrestricted Rate of Discharge Calculations

Pre Development, 1 Year Return =	6.8 l/s
Post Development, 1 Year Return =	4.9 l/s
Pre Development, 10 Year Return =	13.2 l/s
Post Development, 10 Year Return =	9.5 l/s
Pre Development, 30 Year Return =	16.7 l/s
Post Development, 30 Year Return =	12.1 l/s
Pre Development, 100 Year Return =	21.7 l/s
Post Development, 100 Year Return =	15.7 l/s
Post Development, 100 Year Return (plus 20% climate change) =	18.9 l/s
Post Development, 100 Year Return (plus 40% climate change) =	22.0 l/s

Proposed Dischage Rate

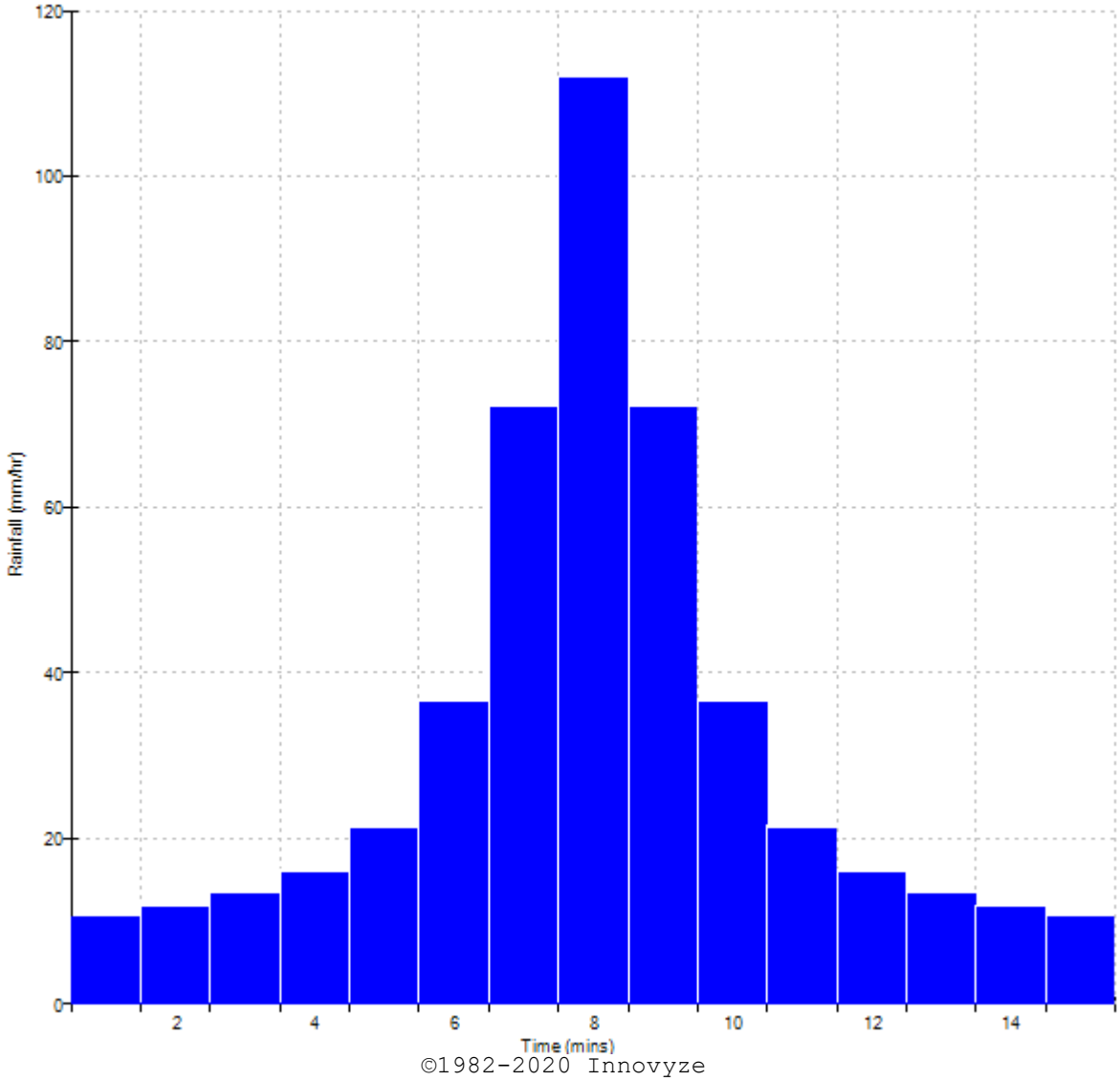
	Pre Development Discharge Rate	Proposed Discharge Rate	Difference		
1 Year Return =	6.8 l/s	1.6 l/s	5.2 l/s	76.5%	
10 Year Return =	13.2 l/s	1.6 l/s	11.6 l/s	87.9%	
30 Year Return =	16.7 l/s	1.6 l/s	15.1 l/s	90.4%	
100 Year Return =	21.7 l/s	1.6 l/s	20.1 l/s	92.6%	
100 Year Return (plus 20% climate change) =	-	1.6 l/s	20.1 l/s	92.6%	*Compared to pre development 1 in 100 year event*
100 Year Return (plus 40% climate change) =	-	1.6 l/s	20.1 l/s	92.6%	

APPENDIX 6.5 RAINFALL PROFILES

Rainfall profile

Storm duration (mins) 15

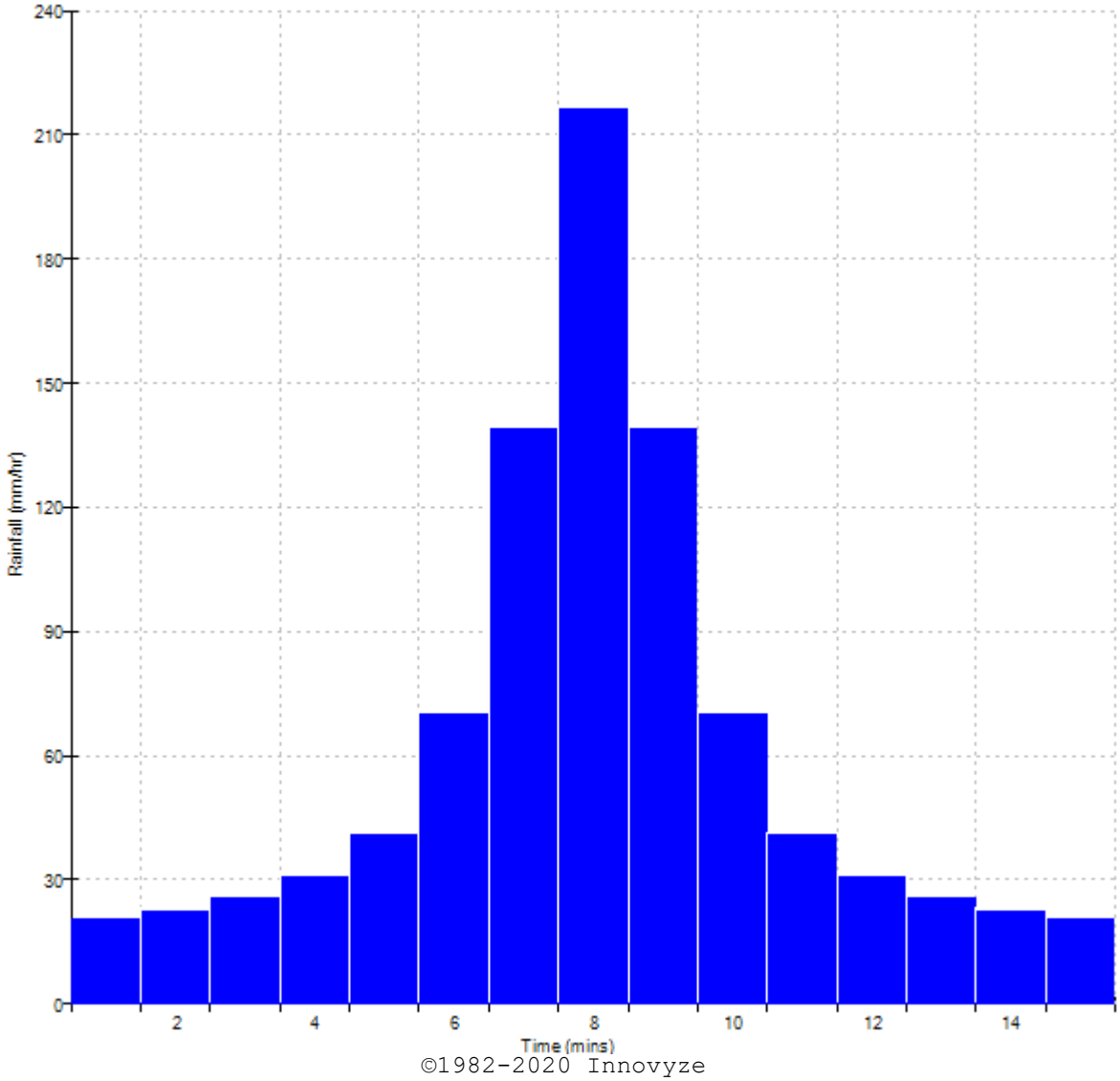
FSR Data	
Region	England and Wales
M5-60 (mm)	20.200
Ratio R	0.413
Peak Intensity (mm/hr)	111.844
Ave. Intensity (mm/hr)	31.648
Return Period (years)	1.0



Rainfall profile

Storm duration (mins) 15

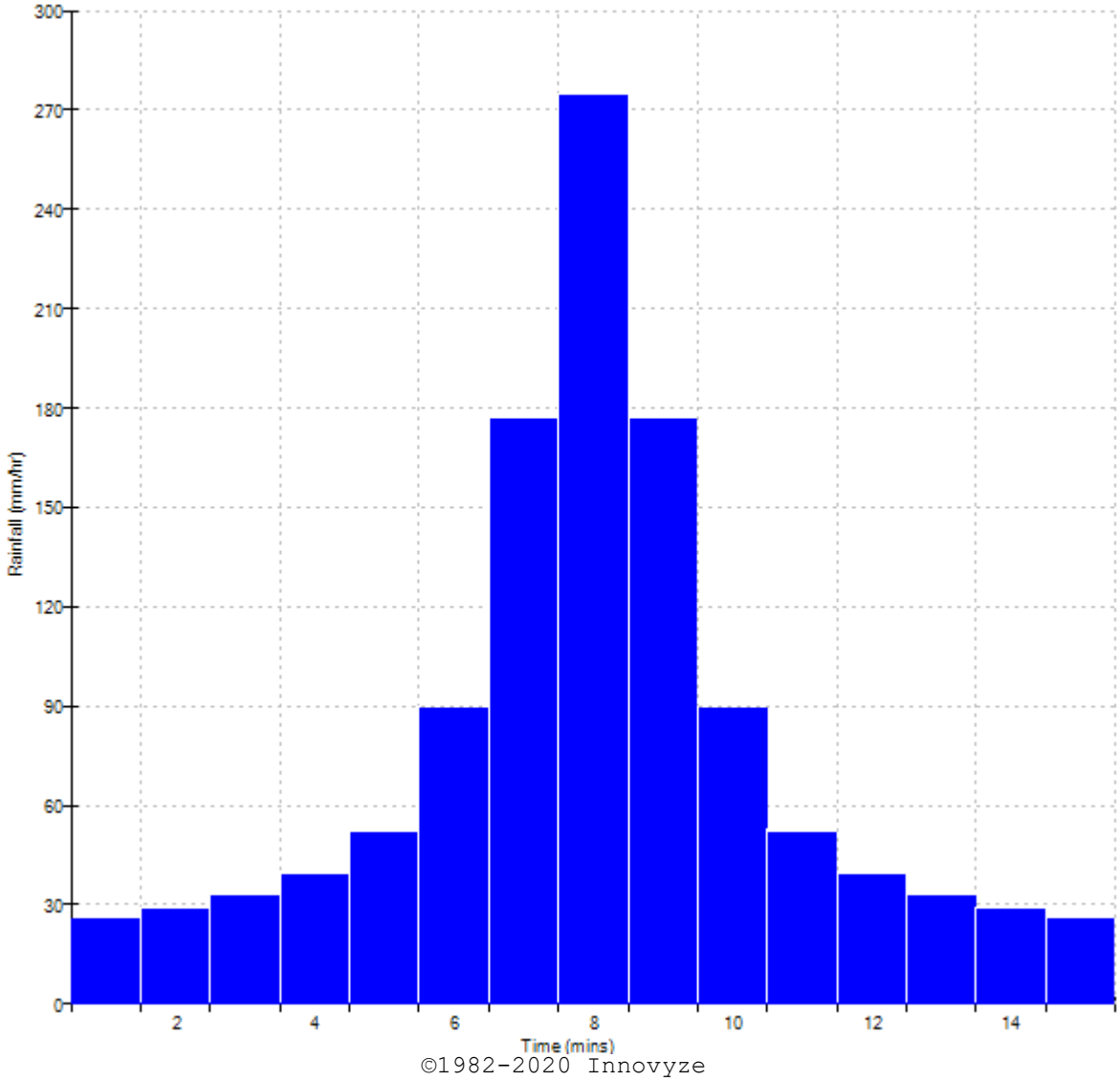
FSR Data	
Region	England and Wales
M5-60 (mm)	20.200
Ratio R	0.413
Peak Intensity (mm/hr)	216.238
Ave. Intensity (mm/hr)	61.188
Return Period (years)	10.0



Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.200
Ratio R	0.413
Peak Intensity (mm/hr)	274.499
Ave. Intensity (mm/hr)	77.674
Return Period (years)	30.0

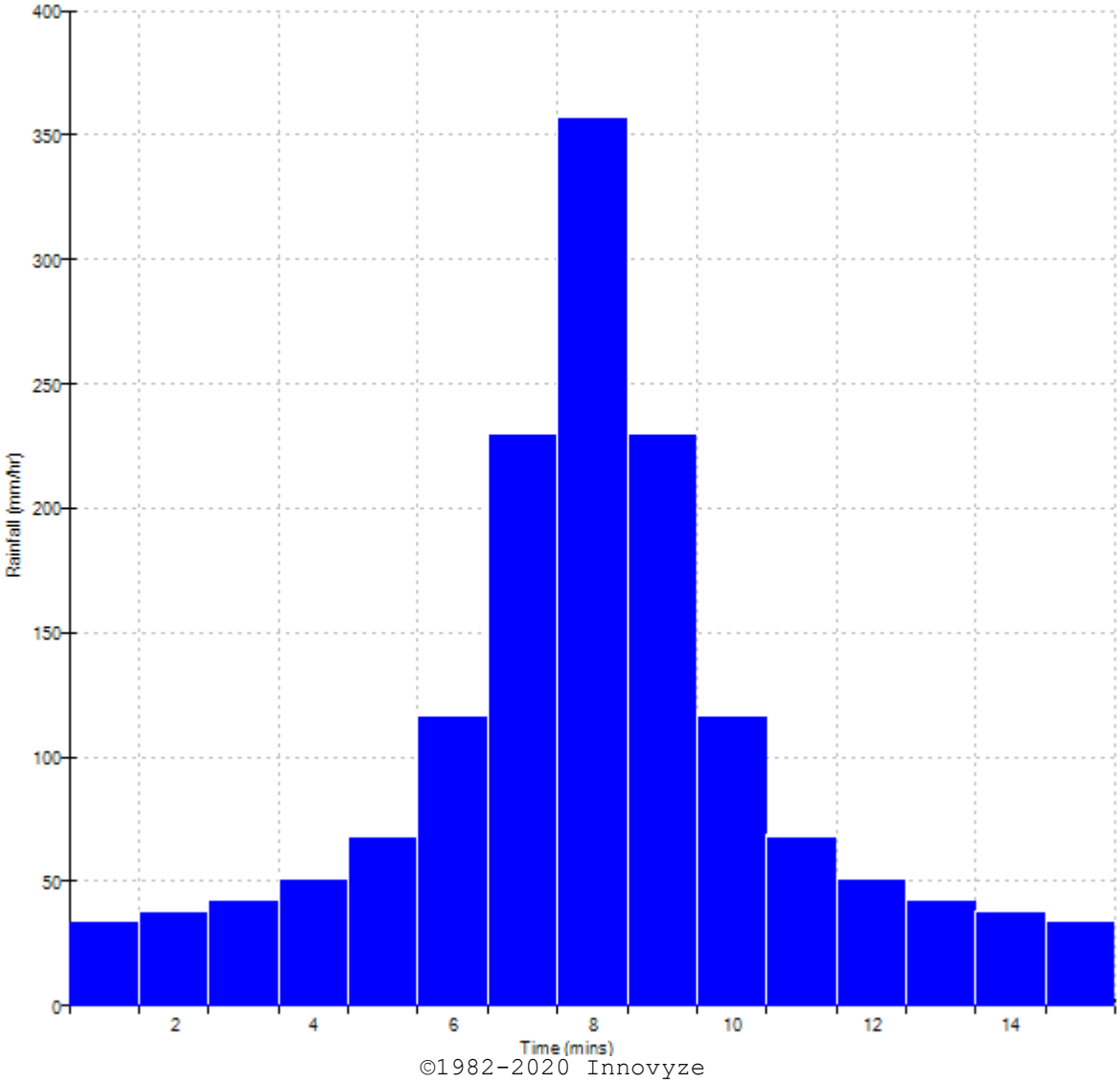


Hodel Consulting		Page 1
The Gatehouse Pattenden Lane TN12 9QS	22-254 Nicholas Way	
Date 05/01/2023 10:09 File	Designed by MJ Checked by	
XP Solutions	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.200
Ratio R	0.413
Peak Intensity (mm/hr)	356.521
Ave. Intensity (mm/hr)	100.883
Return Period (years)	100.0



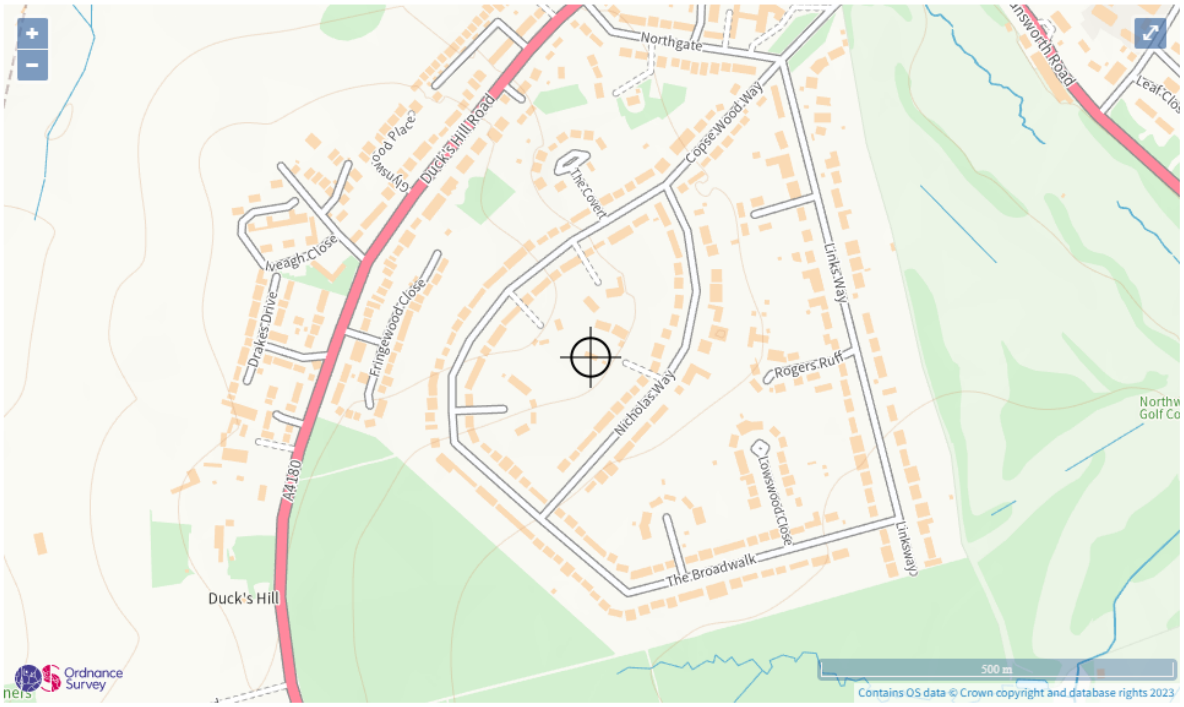
APPENDIX 6.6 FLOOD RISK FROM RIVERS OR SEA

Flood risk

Extent of flooding

Location

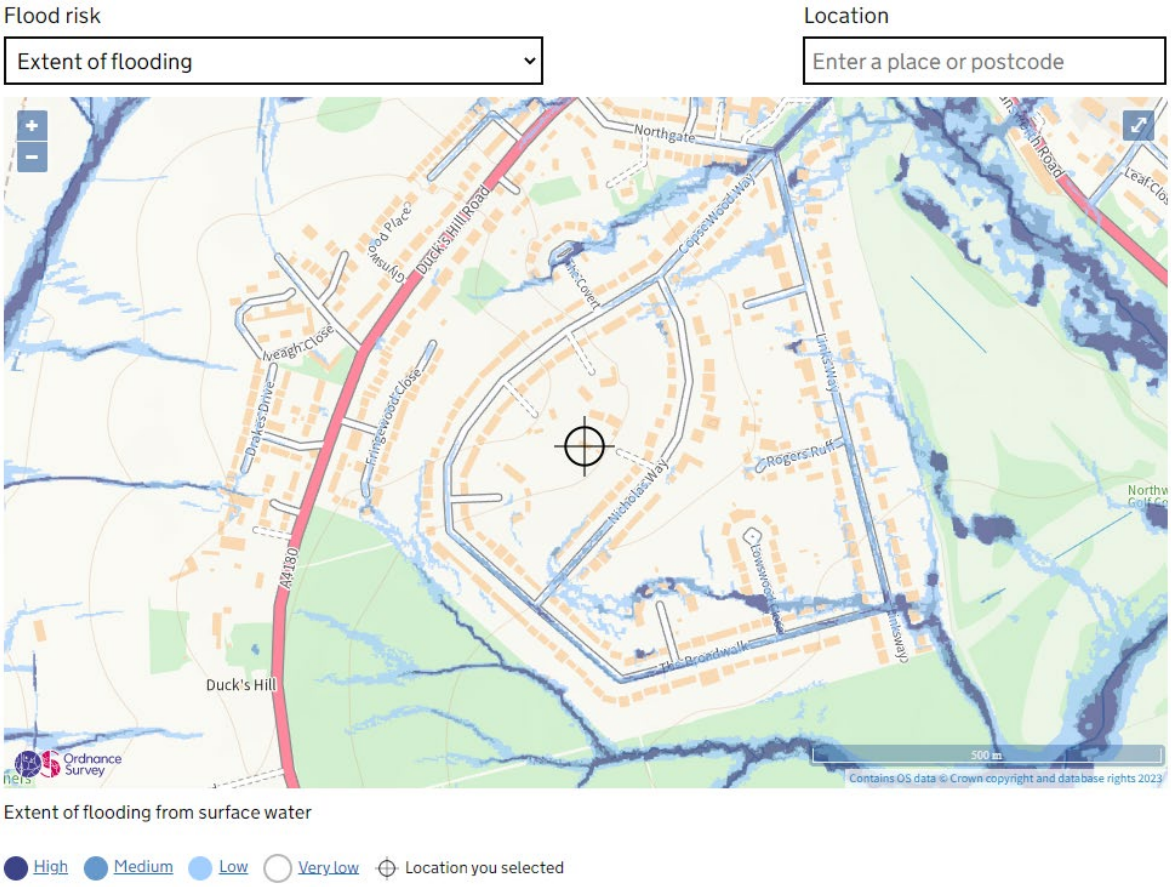
Enter a place or postcode



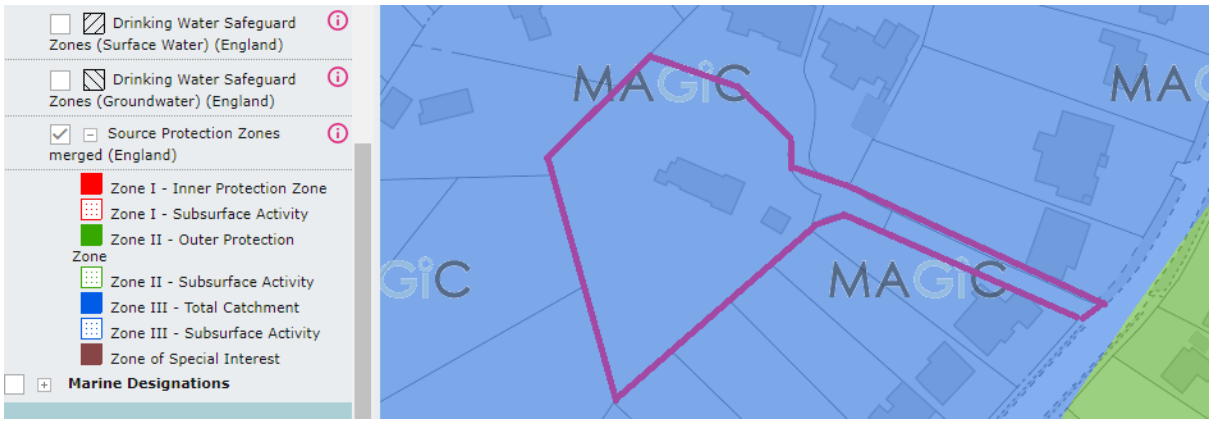
Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

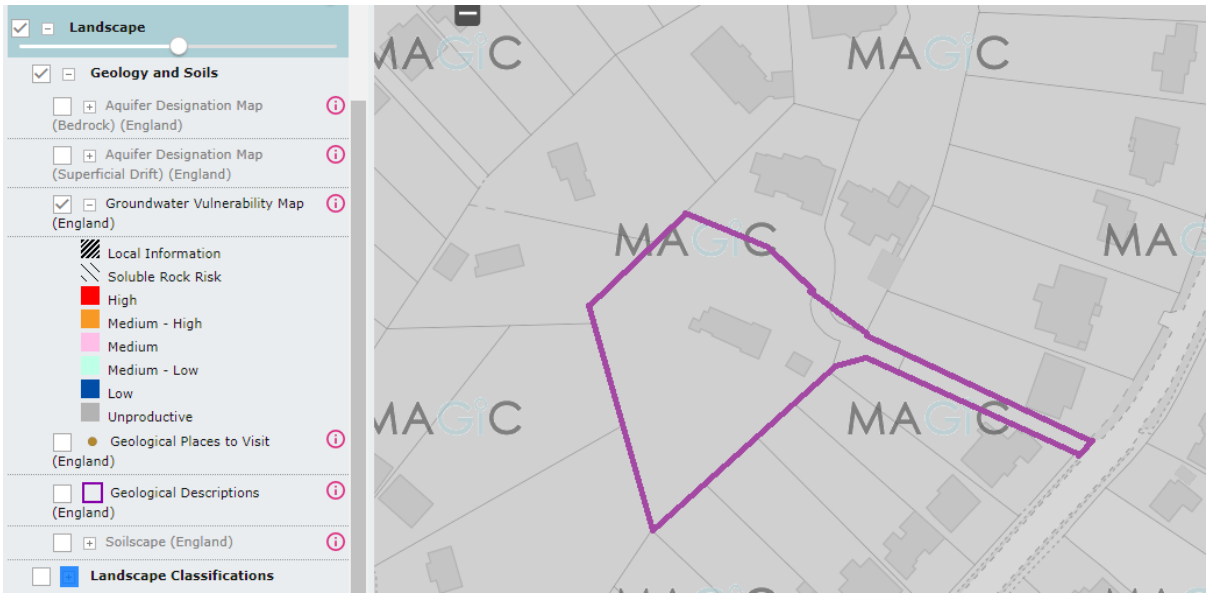
APPENDIX 6.7 FLOOD RISK FROM SURFACE WATER



APPENDIX 6.8 GROUNDWATER SOURCE PROTECTION



APPENDIX 6.9 GROUNDWATER VULNERABILITY



APPENDIX 6.10 FLOOD MAP FOR PLANNING

Flood map for planning

Your reference	Location (easting/northing)	Created
22-254	**508152/190722**	**5 Jan 2023 9:26**

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

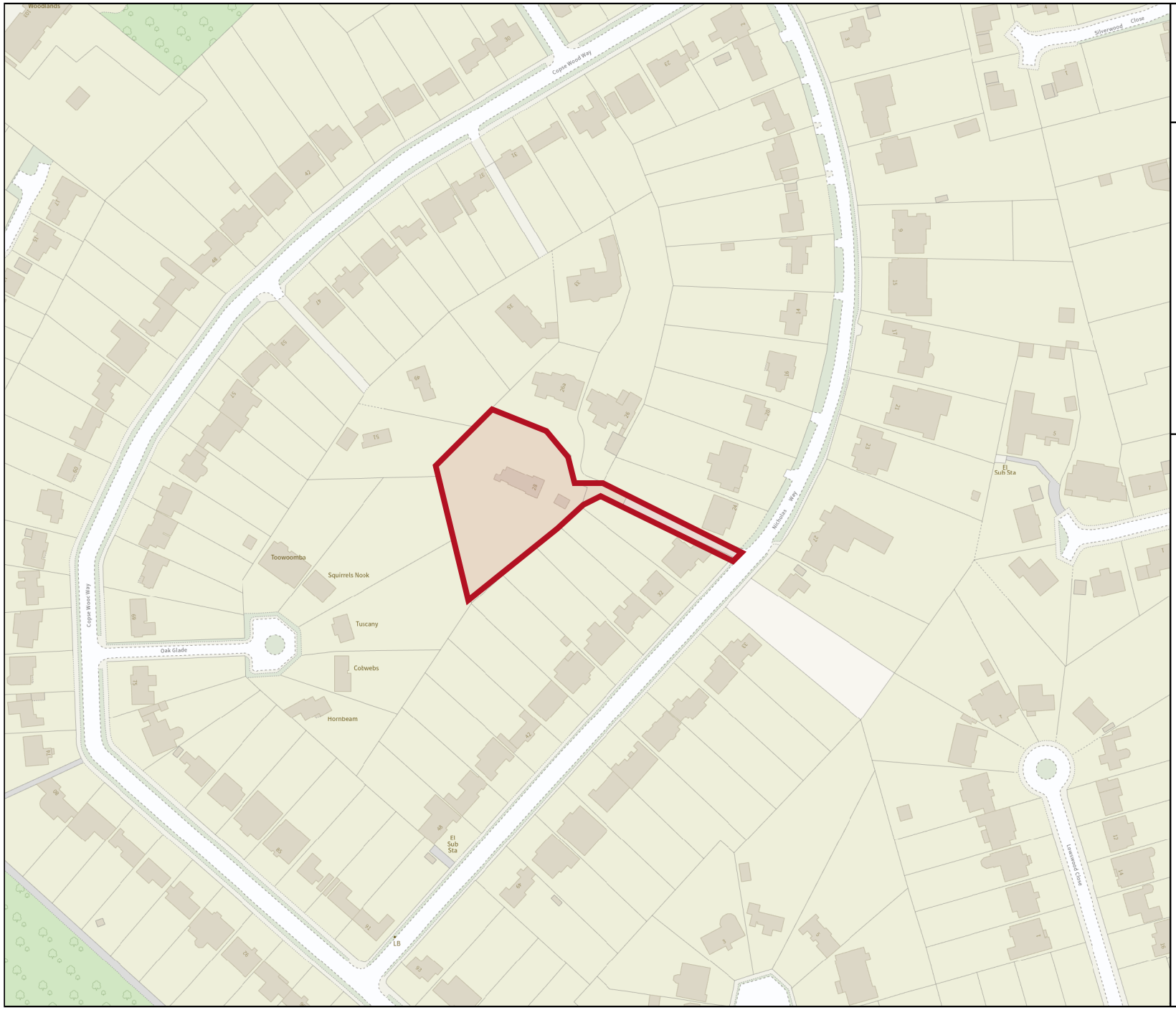
You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 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.



Environment Agency

Flood map for planning

Your reference
22-254

Location (easting/northing)
508152/190722

Scale
1:2500

Created
5 Jan 2023 9:26

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

0 20 40 60m

APPENDIX 6.11 GREENFIELD RUNOFF RATE

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Mark Jennings
Site name:	Nicholas Way
Site location:	HA6 2TT

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.

Site Details

Latitude:	51.60497° N
Longitude:	0.43984° W
Reference:	959110112
Date:	Jan 05 2023 10:14

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.3632

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	664	664
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

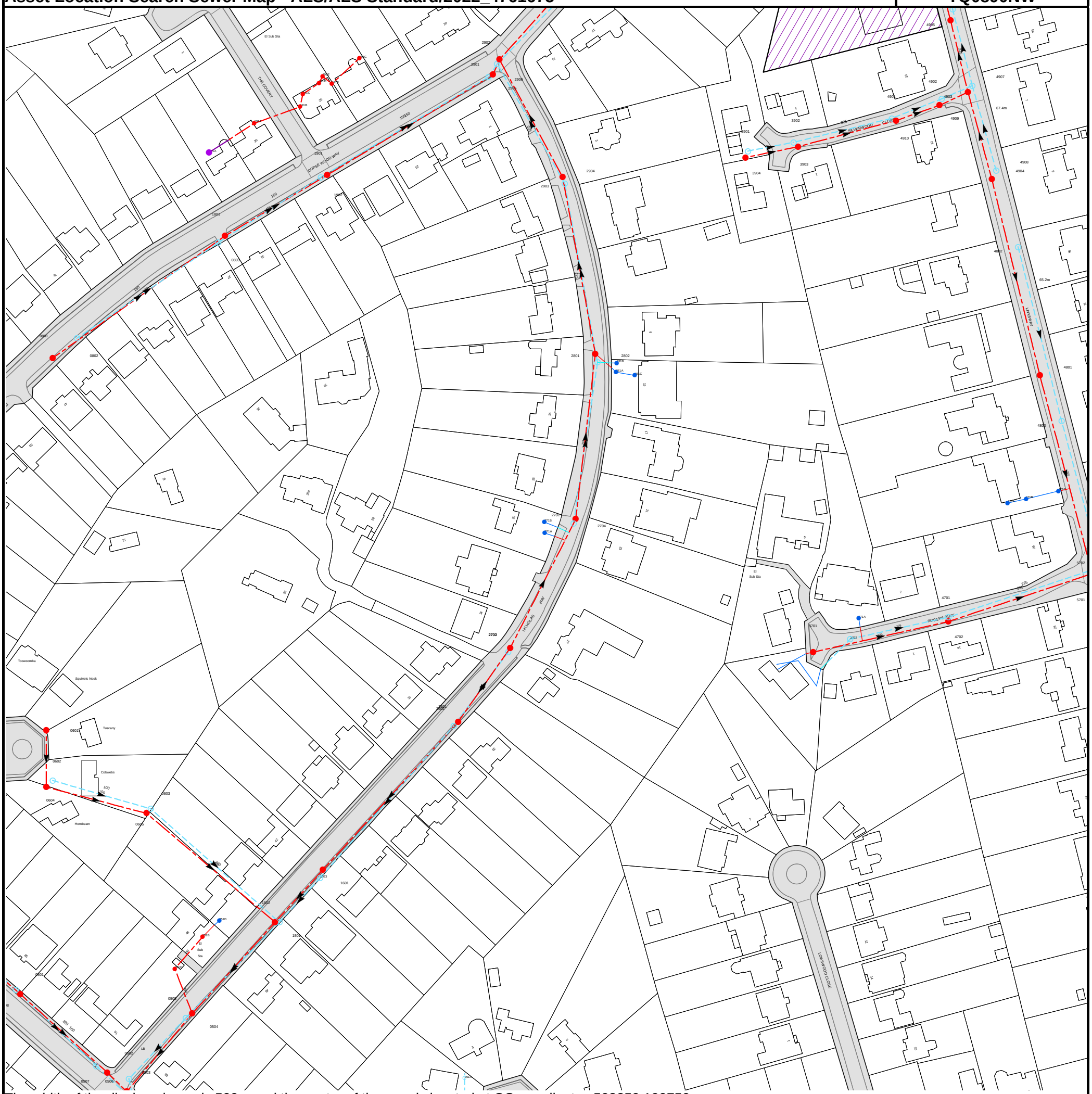
Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	1.65	1.65
1 in 1 year (l/s):	1.4	1.4
1 in 30 years (l/s):	3.79	3.79
1 in 100 year (l/s):	5.26	5.26
1 in 200 years (l/s):	6.17	6.17

APPENDIX 6.12 THAMES WATER SEWER RECORDS

Asset Location Search Sewer Map - ALS/ALS Standard/2022_4761675

TQ0890NW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 508250,190750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.