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HEATH BUILDINGS,

HIGH STREET,

OXSHOTT

SURREY

DRAINAGE STRATEGY REPORT, MANAGEMENT AND MAINTENANCE REQUIREMENTS

Contents

Document Control

Revision	Purpose	Date	By	Approved
-	Initial issue	09/03/2022	MJ	JRH
A	Basement layout amended	29/03/2022	MJ	MJ
B	Updated to latest layouts	26/08/2022	MJ	JRH
C	Drawing updated to latest internal layouts	02/03/2023	MJ	MJ
D	Drawing updated to latest layouts	10/01/2024	MJ	MJ

Prepared By: MJ

Approved By: JRH

Project No.	**21-168**	**Revision**	D	**Date**	26/08/2022

1 INTRODUCTION

1.1.1 Hodel Ltd. has been appointed by Wolsey House Designs Ltd. on behalf of Oxshott Properties Ltd. to produce a strategy for below ground foul and surface water drainage for the proposed development at Heath Buildings, Oxshott, Surrey.

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 818m^2 site has one building with multiple commercial and residential units and an area of hardstanding. 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 The entire site is currently impermeable.

2.1.3 The British National Grid reference is E:514559, N:160507. It is bounded by Oxshott High Street to the east, residential properties to the north and west and by commercial properties to the south.

2.1.4 The general topography of the site is terraced with a step across the existing building with the area to the rear being approximately 1.6m lower.

2.2 Geology

2.2.1 The British Geological Survey (BGS) indicates that the site is likely underlain by Claygate Member – Sand, Silt and Clay. There are no recorded superficial deposits shown.

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 not within a groundwater source protection zone.

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

2.4 Existing Surface Water Strategy

2.4.1 Surface water generated on site drains to the surface water network which discharges unrestricted to Oakshade Road. Road gullies in the High Street appear to drain through the site into the existing onsite drainage, this is to be diverted around the proposed development.

2.5 Existing Foul Water Strategy

2.5.1 The foul water from the existing building drains to the foul water network onsite which discharges to the sewer in Oakshade Road.

3 PROPOSED SITE

3.1.1 The proposal is to demolish the existing building and replace this with a new structure comprising of four commercial units at ground floor level, 10 flats above this and basement level carpark accessible from the rear (west).

3.1.2 The proposed impermeable area is approximately 690m^2, 84% of the entire site, which is a decrease of 128m^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. BGS mapping indicates the site is likely underlain by clay, there is insufficient space onsite and therefore soakaways are not deemed possible. As there are no watercourses within the vicinity of the site, it is proposed to maintain the existing surface water connection but restricting discharge rate.

3.2.2 The pedestrian access paths either side of the building are to be of permeable construction.

3.2.3 The front 46m^2 of hardstanding forms part of the Highstreet and is to continue draining to existing gullies. The existing runoff rate for remainder of the site has been calculated for the 1 in 1, 10, 30 & 100 year events to be 6.6, 12.9, 16.3 & 21.2l/s respectively, it is therefore proposed to restrict the site discharge for the entire site excluding the area of the high street to 2l/s for all events up to and including the 1 in 100 year event with a 20% allowance for climate change to provide a 70% betterment on the existing 1 in 1 year event.

3.2.4 The proposed attenuation tank has an effective volume of approximately 25m^3 and has been sized to hold the 1 in 100 year event with a 40% allowance for climate change to further mitigate surface water flooding in the basement level carpark.

3.2.5 In accordance with the Surrey County Council Guide to Sustainable Drainage in Planning, there shall be no above ground flooding from the network for the 1 in 30 year event and no flooding from the site for the 1 in 100 year with an

allowance for climate change. It has been decided to protect the basement from flooding for all events upto and including the 1 in 100 year +40% and as according to calculations through Innovyze:MicroDrainage, during the critical 1 in 100 year event with a 40% allowance for climate change, the tank will have a freeboard of 78mm. There shall be no increased risk of flooding on or offsite.

3.2.6 Catchpits 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 also act as a filter to prevent pollutants infiltrating to ground.

Calculations and results derived from MicroDrainage, can be found in Appendix 6.3

3.3 Proposed Foul Water Strategy

3.3.1 The foul water is to connect to the existing foul water drainage network onsite and to the foul sewer in the high street.

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 1.

Table 1 - 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.	Management Company
Gutters	Every 12 months, for silt and debris.	Silt and debris to be cleared from gutters.	Management Company
Rainwater Downpipes	Every 12 months, for silt and leaves.	Silt to be cleared from gully pot, leaves to be cleared from gutters and downpipes.	Management Company
Catchpits & Sumps	Every 6 months, for silt, debris or other obstructions.	Silt and debris or obstructions to be cleared from catchpit chambers.	Management Company
Pipework	If a problem occurs, by CCTV surveys	As recommended by CCTV survey company.	Management Company
Attenuation Tank	As per manufacturer recommendations.	As per manufacturer recommendations.	Management Company
Pump	As per manufacturer recommendations.	As per manufacturer recommendations.	Management Company
Permeable Paving	As per manufacturer recommendations.	As per manufacturer recommendations.	Management Company

5 CONCLUSION

5.1.1 In accordance with the NPPF requirements surface water from the roof and other hardstanding areas is to be attenuated below ground and discharge to the sewer at a combined restricted rate of 2l/s for the 1 in 100 year event with a 20% allowance for climate change, 30% of the existing site runoff rate for the 1 in 1 year event. The 1 in 100 year event with a 40% allowance for climate change has been assessed and this shall entirely be held within the network.

The footpaths either side of the building are to be of permeable construction and as such are self-draining.

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

5.1.2 The foul water shall discharge to the foul drainage network onsite and the foul sewer in the high street.

5.1.3 Ongoing management and maintenance will be required for the surface water drainage, as detailed in the above Table 1.

6 APPENDICES

6.1 Engineering Layout

6.2 Drained Areas Analysis Sketch

6.3 MicroDrainage Calculations and Results

6.4 Flood Risk from Rivers and Sea

6.5 Flood Risk from Surface Water

6.6 Groundwater Source Protection

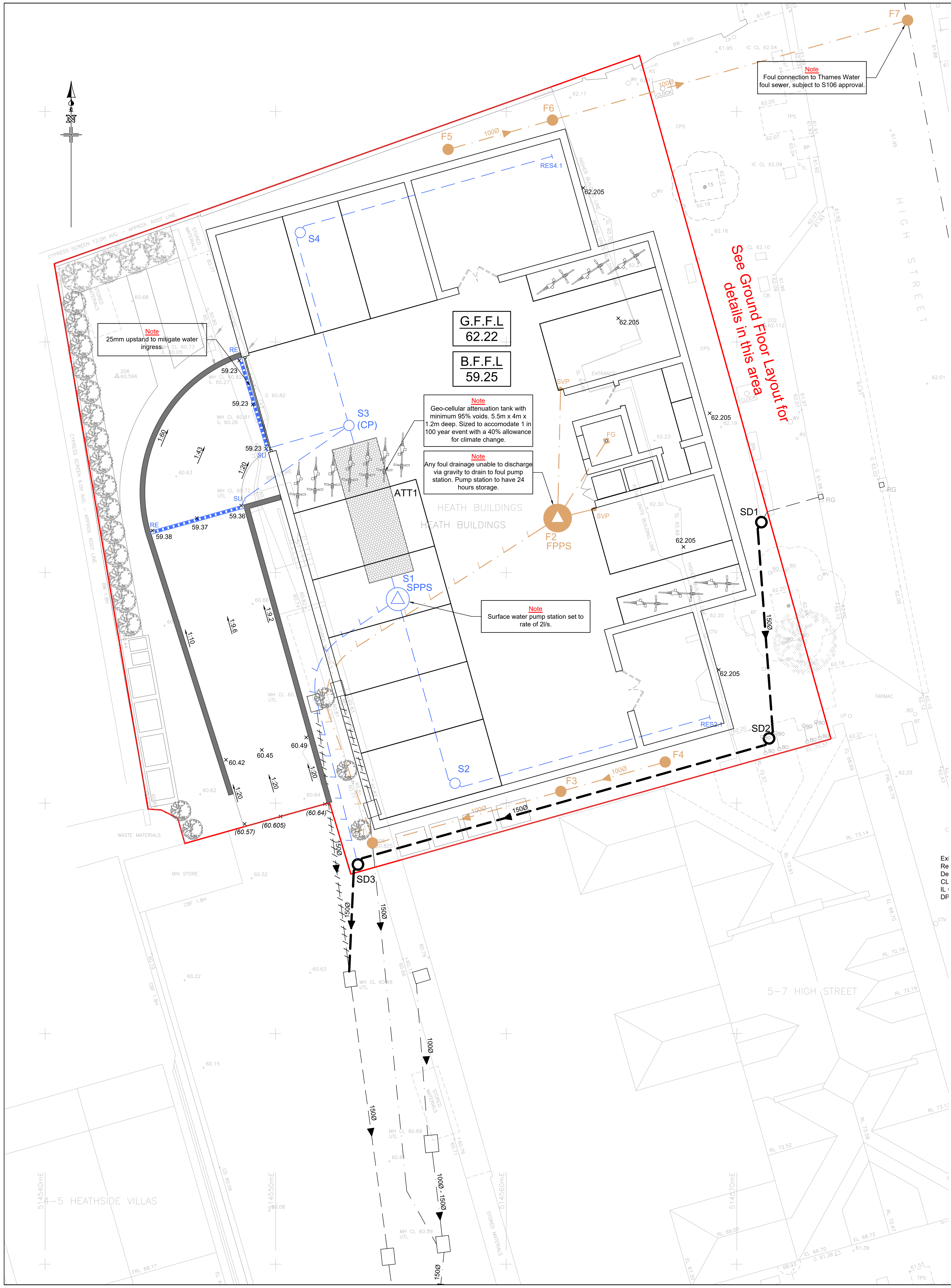
6.7 Groundwater Vulnerability

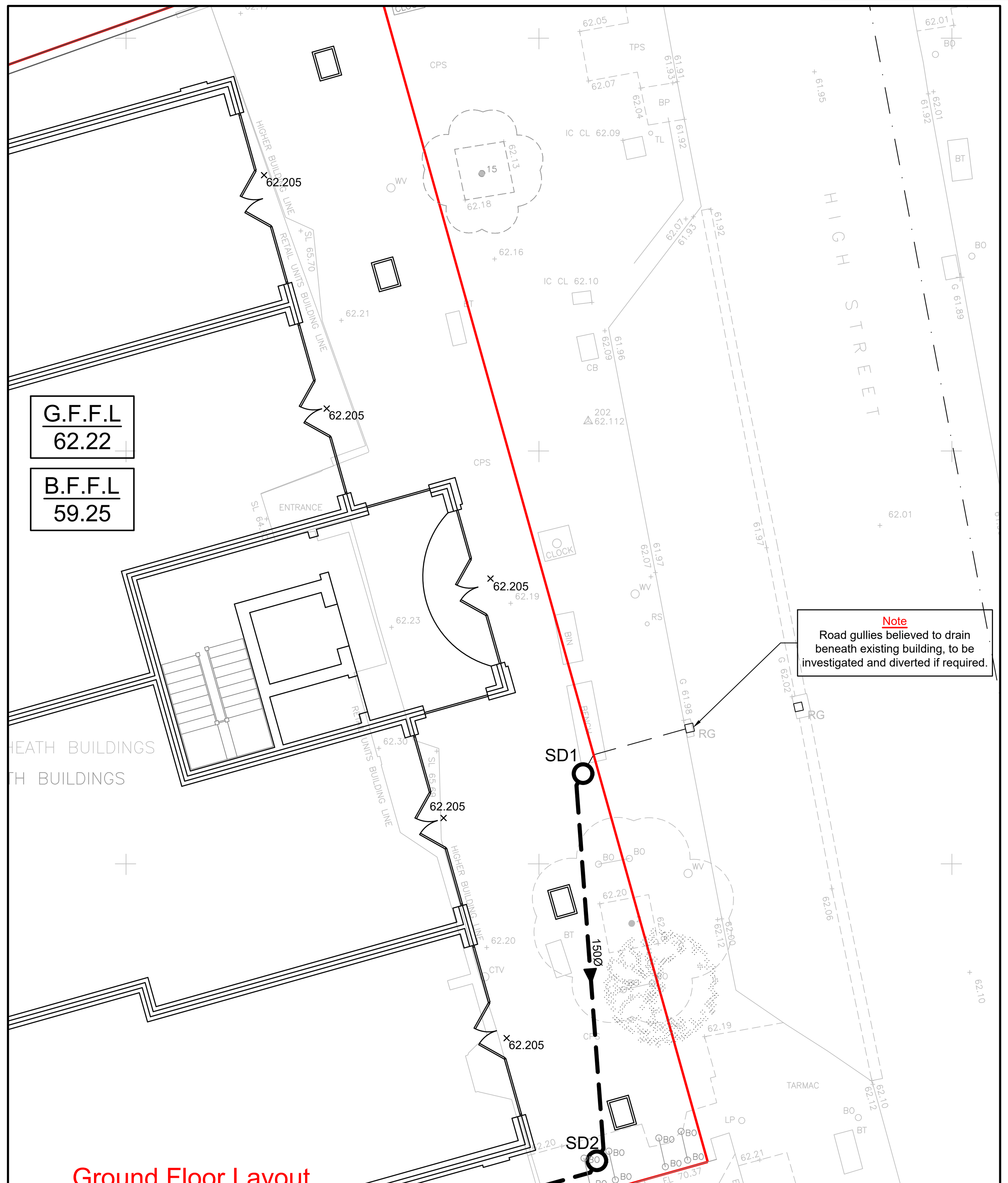
6.8 Site Discharge Rates

6.9 Rainfall Profiles

6.10 Flood Map for Planning

APPENDIX 6.1 ENGINEERING LAYOUT





Ground Floor Layout
(Scale 1:100)

Key:

Private Drainage

- 150Ø, 1:80 -Surface water drain.
- S1 -Surface water chamber. (CP denotes catchpit chamber minimum 300mm sump).
- R -Rain water down pipe.
- RE -Rodding eye.
- SU -Channel drain and sump/gully unit.
- -Pumped surface water rising main.
- SPPS -Surface water package pump station. (Refer to specialist details)
- ATT1 -Prefabricated void forming attenuation tank.
- 150Ø, 1:80 -Foul water drain.
- F1 -Foul water chamber.
- SVP -Soil and vent pipe.
- 150Ø, 1:80 -Suspended basement foul water drain.
- RE -Suspended basement foul rodding eye.
- -Pumped foul water rising main.
- FPPS -Foul package pump station.

Adoptable Drainage

- 150Ø, 1:80 -Surface water sewer. (pipe dia. & gradient)
- S1 -Surface water manhole.

Existing Drainage/Sewers

- 150Ø -Surface water drain/sewer to remain.
- 150Ø -Foul water drain/sewer to remain.
- 150Ø -Surface water drain/sewer to be abandoned and filled with pfa cement grout.
- 150Ø -Foul water drain/sewer to be abandoned and filled with pfa cement grout.
- RG -Road gully.

General

- 62.77 -Existing level.
- × (50.00) -Existing level interpolated.
- × 50.00 -Proposed level.
- 1:50 -Proposed fall.
- -Retaining structure.

NOTES

1. Scale for planning purposes only.
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	21304-S1		June'21
Proposed Site Plan	HBL/04F		Dec'23

RISK ASSESSMENT

Residual Risks Identified

1. None currently identified, 25/02/22

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.

Rev	Date	By	Chkd.	Revision notes
D	10/01/24	MJ	JRH	Updated to latest layouts.
C	02/03/23	MJ	MJ	Updated to latest layouts.
B	26/08/22	MJ	JRH	Updated to latest layouts.
A	29/03/22	MJ	MJ	Updated to show latest basement layout.
-	09/03/22	MJ	JRH	Preliminary issue.

Job Title

Heath Buildings
High Street, Oxshott

Drawing Title

Engineering Layout

Client

Oxshott Properties Ltd.

HODEL CONSULTING ENGINEERS
01732 617555
mail@hodel.uk

0m 1.0m 2.0m 3.0m 4.0m 5.0m 6.0m 7.0m 8.0m 9.0m 10.0m
1:100

Scale at A1: 1:100	Status: PRELIMINARY	
Drawn: MJ	Checked: JRH	Approved: -
Date: March'22	Date: March'22	Date: xxx

Drawing No.: **21-168_C01**

Revision: **D**

APPENDIX 6.2 DRAINED AREAS ANALYSIS SKETCH

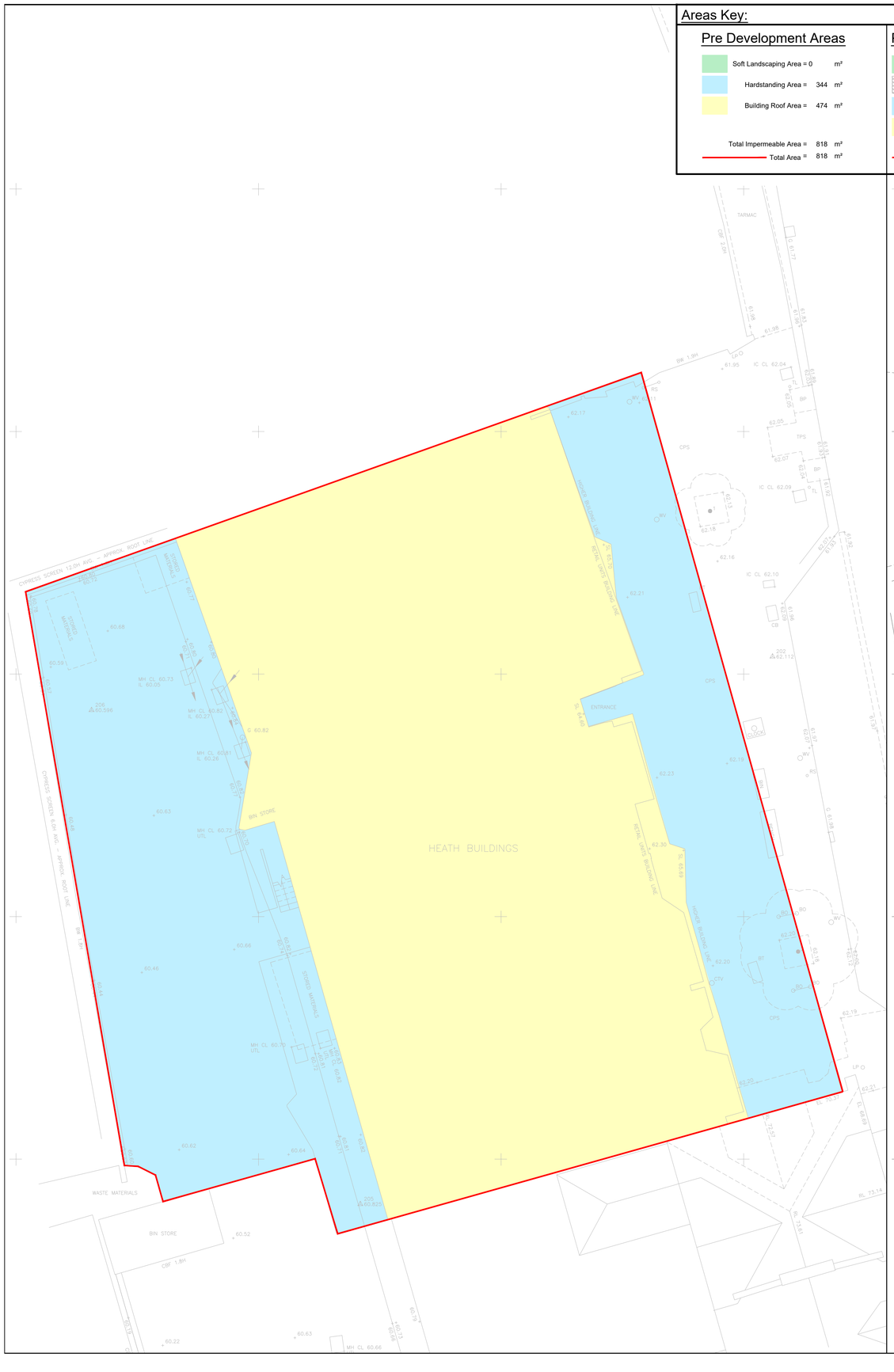
Areas Key:

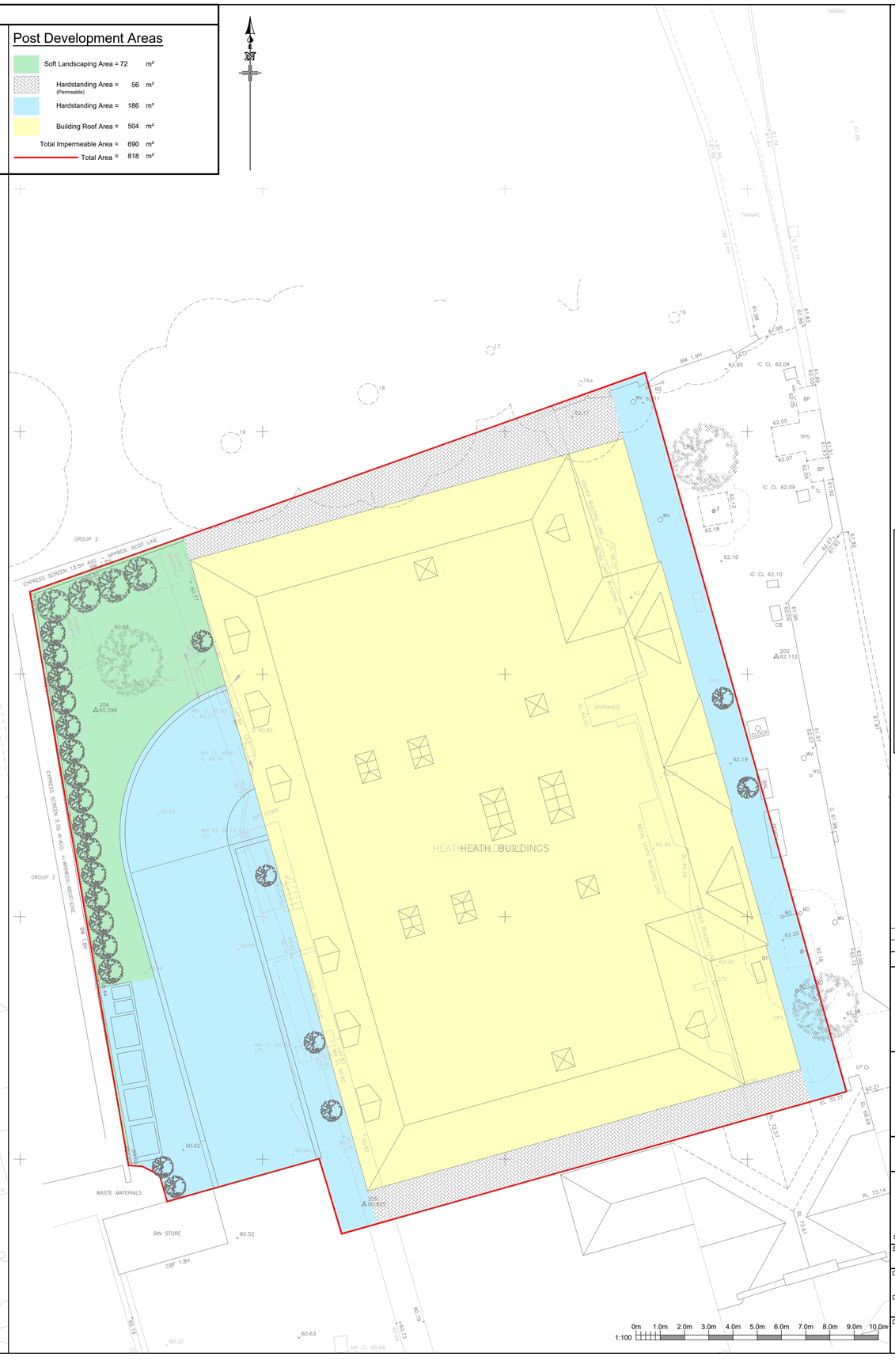
Pre Development Areas

Soft Landscaping Area =	0	m²
Hardstanding Area =	344	m²
Building Roof Area =	474	m²
Total Impermeable Area =	818	m²
Total Area =	818	m²

Post Development Areas

Soft Landscaping Area =	72	m²
Hardstanding Area = (Permeable)	56	m²
Hardstanding Area =	186	m²
Building Roof Area =	504	m²
Total Impermeable Area =	690	m²
Total Area =	818	m²





0m 1.0m 2.0m 3.0m 4.0m 5.0m 6.0m 7.0m 8.0m 9.0m 10.0m
1:100

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.

RISK ASSESSMENT

Residual Risks Identified

1. None currently identified, 25/02/22

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.

Rev	Date	By	Chkd.	Revision notes
A	26/08/22	MJ	JDH	Updated to latest layouts.
-	09/03/22	MJ	JDH	Preliminary issue.

Job Title

Heath Buildings
High Street, Oxshott

Drawing Title

Drained Areas Sketch

Client

Oxshott Properties Ltd.

HODEL CONSULTING ENGINEERS
01732 617555
mail@hodel.uk

Scale at A1: 1:100	Status: PRELIMINARY	
Drawn: MJ Date: March'22	Checked: JDH Date: March'22	Approved: - Date: xxx
Drawing No.: 21-168_SKC01		Revision: A

APPENDIX 6.3 MICRODRAINAGE CALCULATIONS AND RESULTS

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

Half Drain Time : 116 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	58.142	0.692	0.0	2.0	2.0	14.5	O K
30 min Summer	58.309	0.859	0.0	2.0	2.0	18.0	O K
60 min Summer	58.404	0.954	0.0	2.0	2.0	19.9	O K
120 min Summer	58.377	0.927	0.0	2.0	2.0	19.4	O K
180 min Summer	58.326	0.876	0.0	2.0	2.0	18.3	O K
240 min Summer	58.273	0.823	0.0	2.0	2.0	17.2	O K
360 min Summer	58.166	0.716	0.0	2.0	2.0	15.0	O K
480 min Summer	58.064	0.614	0.0	2.0	2.0	12.8	O K
600 min Summer	57.969	0.519	0.0	2.0	2.0	10.8	O K
720 min Summer	57.880	0.430	0.0	2.0	2.0	9.0	O K
960 min Summer	57.728	0.278	0.0	2.0	2.0	5.8	O K
1440 min Summer	57.531	0.081	0.0	2.0	2.0	1.7	O K
2160 min Summer	57.455	0.005	0.0	2.0	2.0	0.1	O K
2880 min Summer	57.452	0.002	0.0	2.0	2.0	0.1	O K
4320 min Summer	57.451	0.001	0.0	1.5	1.5	0.1	O K
5760 min Summer	57.450	0.000	0.0	0.8	0.8	0.1	O K
7200 min Summer	57.450	0.000	0.0	0.7	0.7	0.1	O K
8640 min Summer	57.450	0.000	0.0	0.6	0.6	0.1	O K
10080 min Summer	57.450	0.000	0.0	0.5	0.5	0.1	O K
15 min Winter	58.240	0.790	0.0	2.0	2.0	16.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	16.6	18
30 min Summer	90.705	0.0	21.8	32
60 min Summer	56.713	0.0	27.3	60
120 min Summer	34.246	0.0	32.9	100
180 min Summer	25.149	0.0	36.2	132
240 min Summer	20.078	0.0	38.6	166
360 min Summer	14.585	0.0	41.7	234
480 min Summer	11.622	0.0	44.2	300
600 min Summer	9.738	0.0	46.4	364
720 min Summer	8.424	0.0	48.2	428
960 min Summer	6.697	0.0	50.9	548
1440 min Summer	4.839	0.0	55.3	766
2160 min Summer	3.490	0.0	59.6	1068
2880 min Summer	2.766	0.0	62.6	1556
4320 min Summer	1.989	0.0	66.4	2144
5760 min Summer	1.573	0.0	68.7	3056
7200 min Summer	1.311	0.0	73.3	3432
8640 min Summer	1.129	0.0	77.0	4472
10080 min Summer	0.994	0.0	80.0	5056
15 min Winter	138.153	0.0	18.6	18

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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	58.438	0.988	0.0	2.0	2.0	20.6	O K
60 min Winter	58.572	1.122	0.0	2.0	2.0	23.5	O K
120 min Winter	58.560	1.110	0.0	2.0	2.0	23.2	O K
180 min Winter	58.485	1.035	0.0	2.0	2.0	21.6	O K
240 min Winter	58.408	0.958	0.0	2.0	2.0	20.0	O K
360 min Winter	58.245	0.795	0.0	2.0	2.0	16.6	O K
480 min Winter	58.088	0.638	0.0	2.0	2.0	13.3	O K
600 min Winter	57.943	0.493	0.0	2.0	2.0	10.3	O K
720 min Winter	57.809	0.359	0.0	2.0	2.0	7.5	O K
960 min Winter	57.599	0.149	0.0	2.0	2.0	3.1	O K
1440 min Winter	57.452	0.002	0.0	2.0	2.0	0.1	O K
2160 min Winter	57.452	0.002	0.0	2.0	2.0	0.1	O K
2880 min Winter	57.451	0.001	0.0	1.5	1.5	0.1	O K
4320 min Winter	57.450	0.000	0.0	0.8	0.8	0.1	O K
5760 min Winter	57.450	0.000	0.0	0.6	0.6	0.1	O K
7200 min Winter	57.450	0.000	0.0	0.5	0.5	0.0	O K
8640 min Winter	57.450	0.000	0.0	0.4	0.4	0.0	O K
10080 min Winter	57.450	0.000	0.0	0.4	0.4	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	90.705	0.0	24.4	32
60 min Winter	56.713	0.0	30.5	60
120 min Winter	34.246	0.0	36.9	114
180 min Winter	25.149	0.0	40.6	142
240 min Winter	20.078	0.0	43.1	180
360 min Winter	14.585	0.0	47.1	254
480 min Winter	11.622	0.0	49.6	324
600 min Winter	9.738	0.0	51.8	390
720 min Winter	8.424	0.0	53.7	450
960 min Winter	6.697	0.0	57.1	560
1440 min Winter	4.839	0.0	61.5	762
2160 min Winter	3.490	0.0	66.4	1264
2880 min Winter	2.766	0.0	68.9	1452
4320 min Winter	1.989	0.0	71.7	2340
5760 min Winter	1.573	0.0	79.1	3184
7200 min Winter	1.311	0.0	84.5	0
8640 min Winter	1.129	0.0	87.4	0
10080 min Winter	0.994	0.0	89.8	0

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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)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.064

Time (mins) From:	To:	Area (ha)
0	4	0.064

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Model Details

Storage is Online Cover Level (m) 59.250

Cellular Storage Structure

Invert Level (m) 57.450 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	22.0	22.0	1.201	0.0	44.8
1.200	22.0	44.8			

Pump Outflow Control

Invert Level (m) 57.450

Depth (m)	Flow (l/s)
0.001	2.0000

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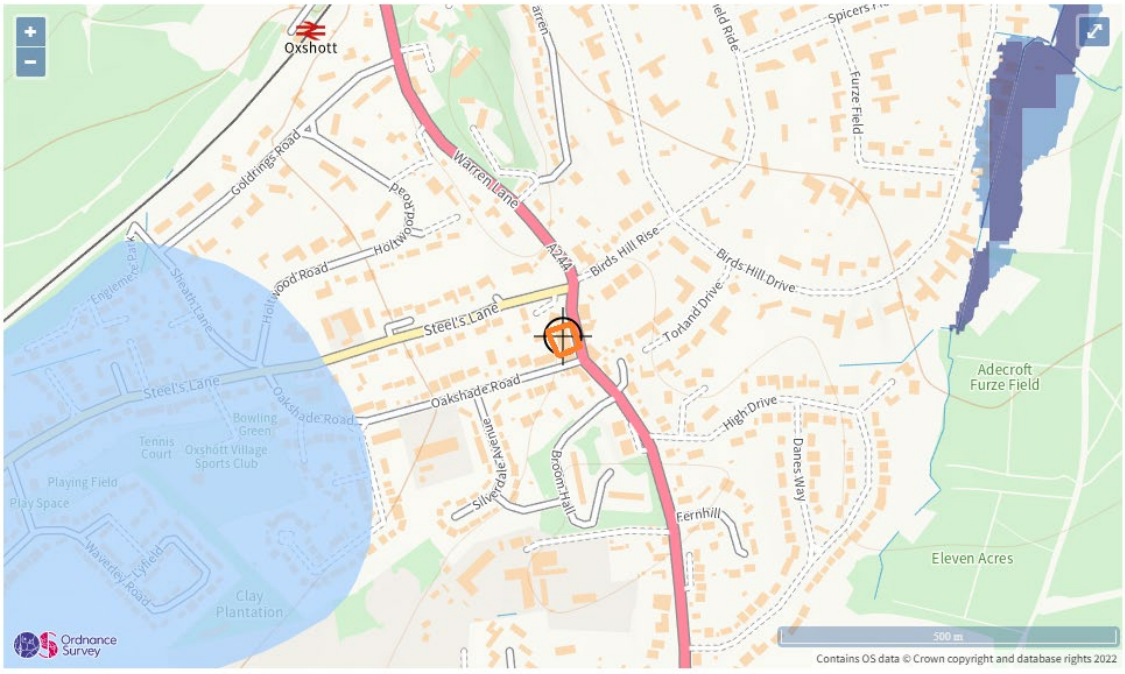
APPENDIX 6.4 FLOOD RISK FROM RIVERS OR SEA

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

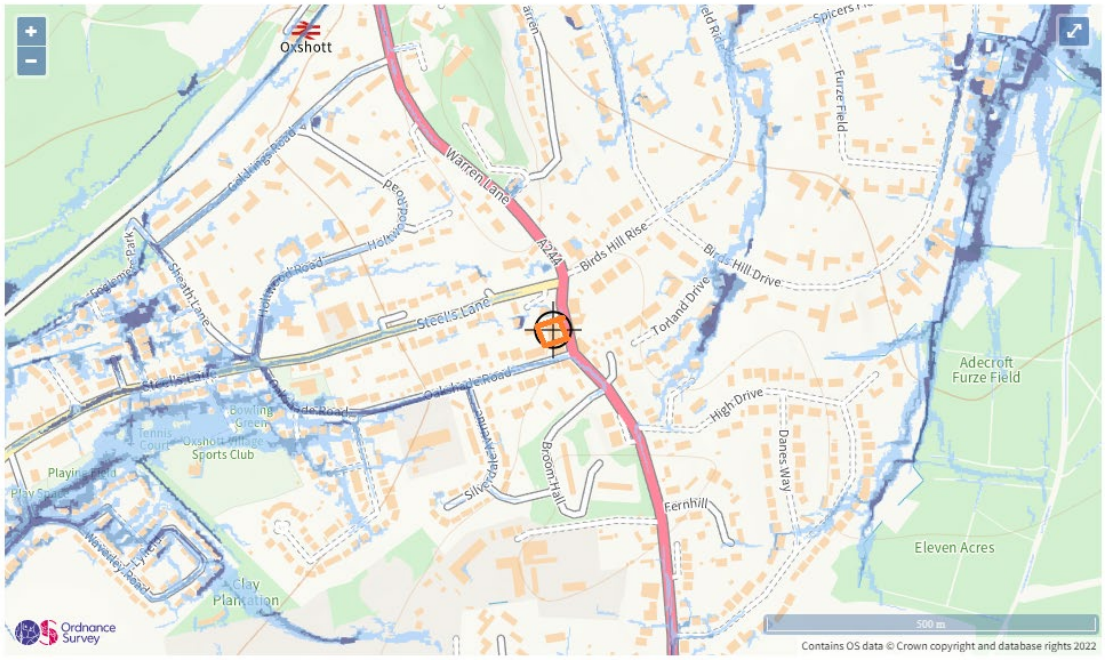
APPENDIX 6.5 FLOOD RISK FROM SURFACE WATER

Flood risk

Extent of flooding

Location

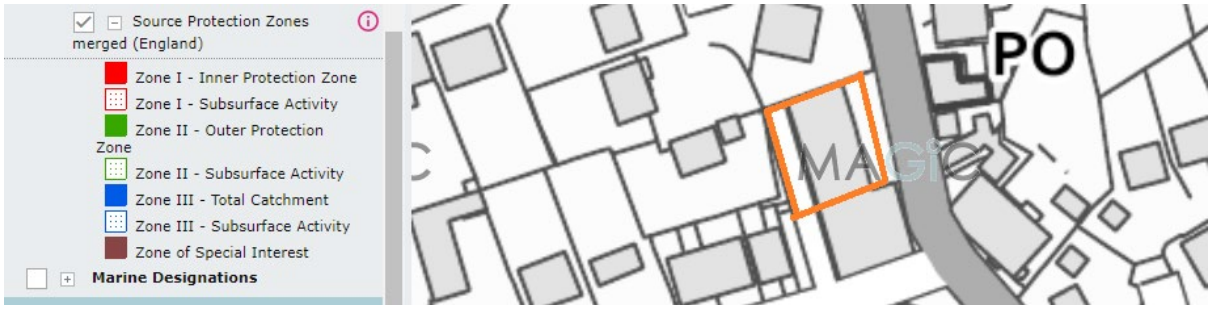
Enter a place or postcode



Extent of flooding from surface water

High Medium Low Very low Location you selected

APPENDIX 6.6 GROUNDWATER SOURCE PROTECTION



APPENDIX 6.7 GROUNDWATER VULNERABILITY

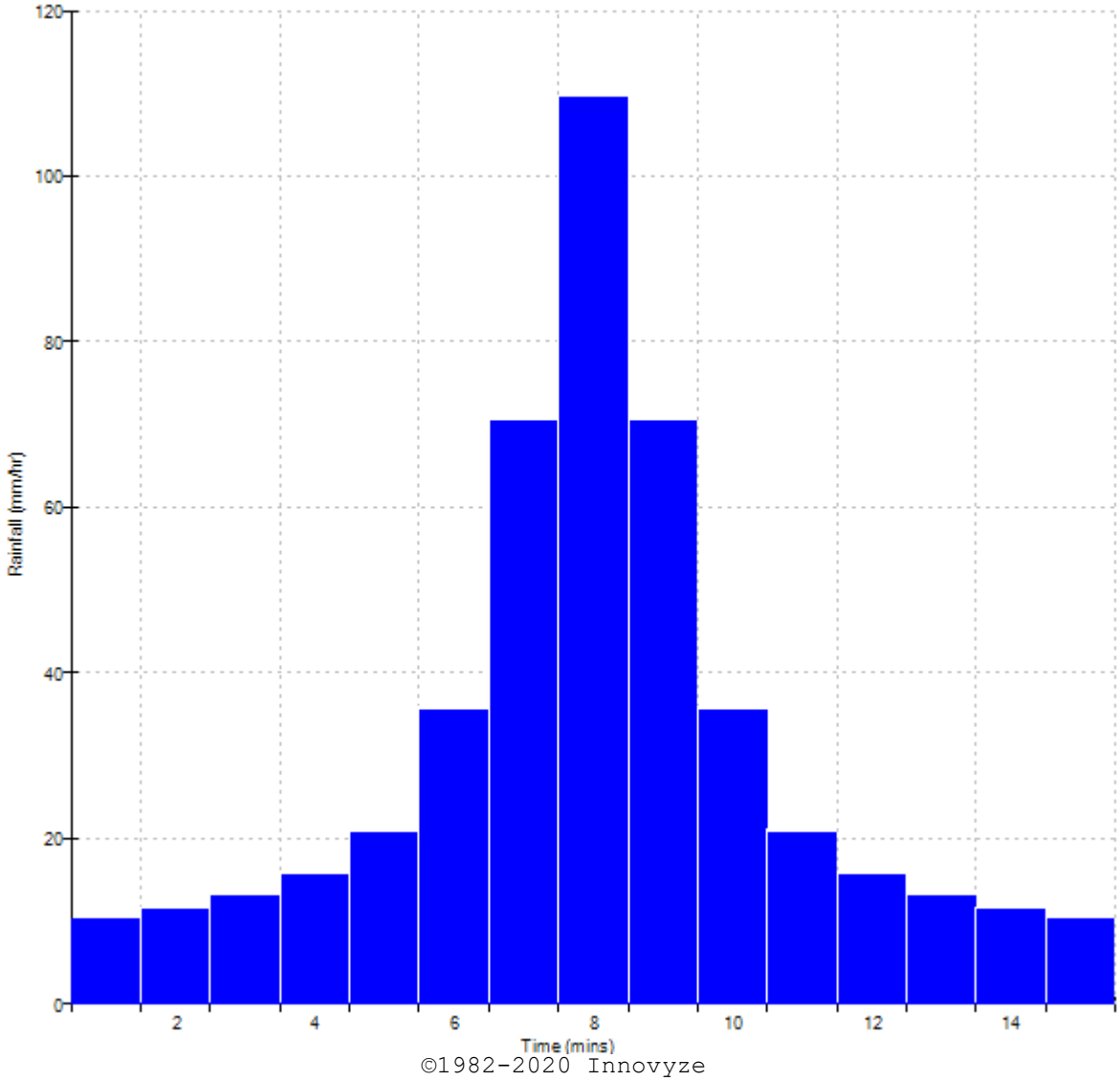
APPENDIX 6.8 SITE DISCHARGE RATES

APPENDIX 6.9 RAINFALL PROFILES

Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Peak Intensity (mm/hr)	109.521
Ave. Intensity (mm/hr)	30.991
Return Period (years)	1.0



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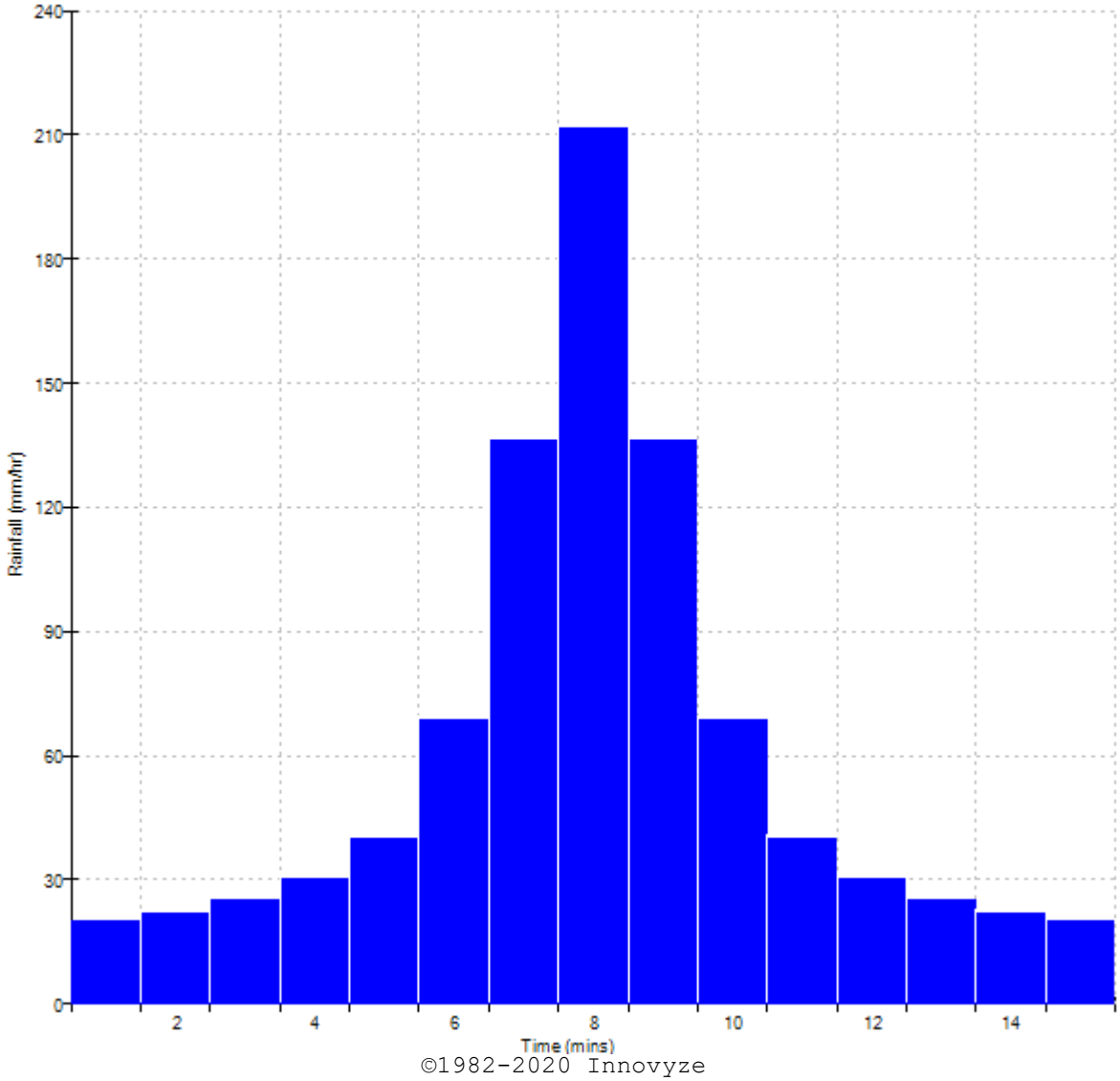
Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Peak Intensity (mm/hr)	211.819
Ave. Intensity (mm/hr)	59.937
Return Period (years)	10.0



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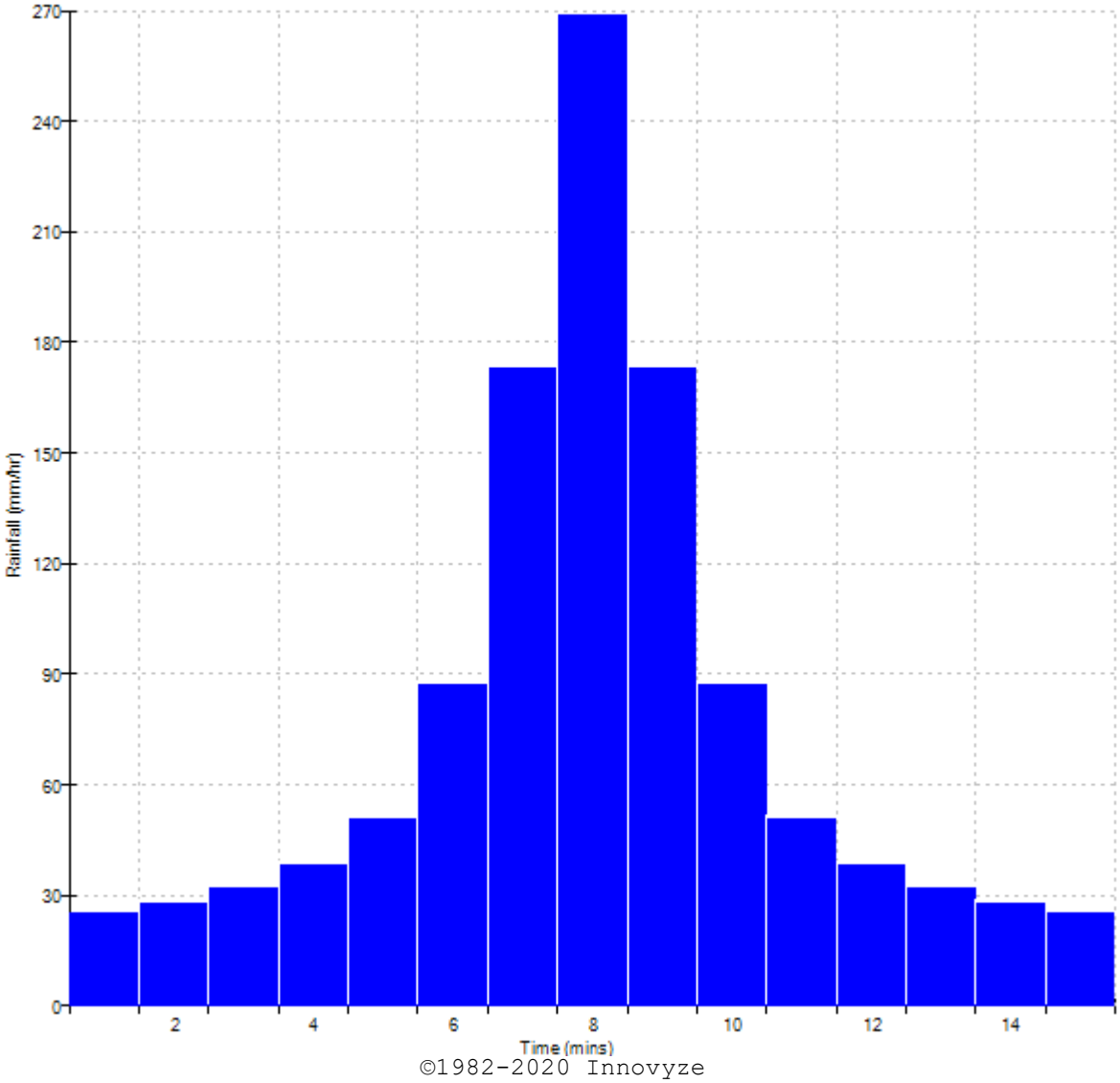
Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Peak Intensity (mm/hr)	268.706
Ave. Intensity (mm/hr)	76.035
Return Period (years)	30.0



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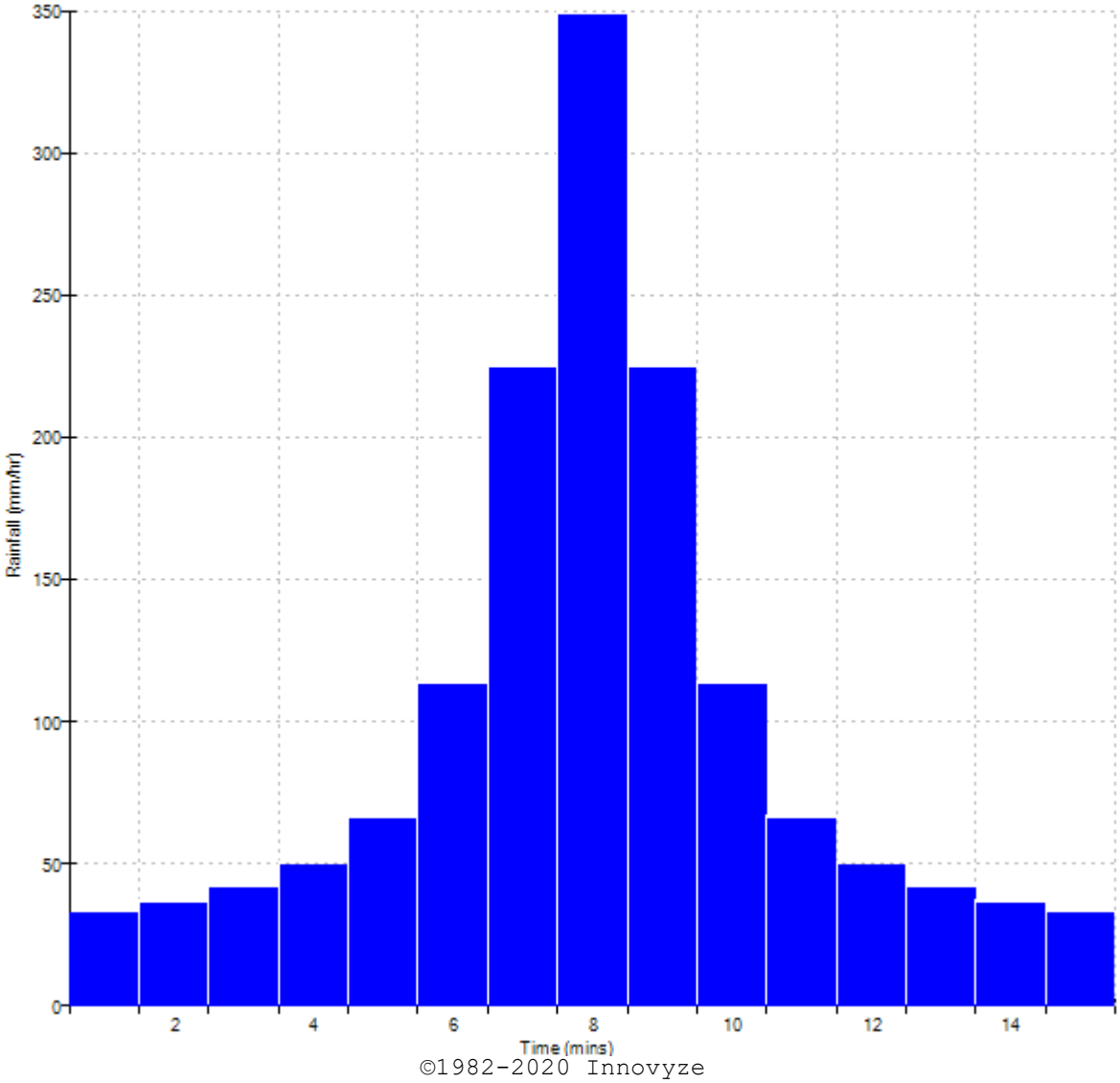
Rainfall profile

Storm duration (mins) 15

FSR Data	
Region	England and Wales
M5-60 (mm)	20.000
Ratio R	0.400
Peak Intensity (mm/hr)	348.738
Ave. Intensity (mm/hr)	98.681
Return Period (years)	100.0



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APPENDIX 6.10 FLOOD MAP FOR PLANNING

Flood map for planning

Your reference	Location (easting/northing)	Created
21-168	**514559/160507**	**3 Mar 2022 13:47**

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

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

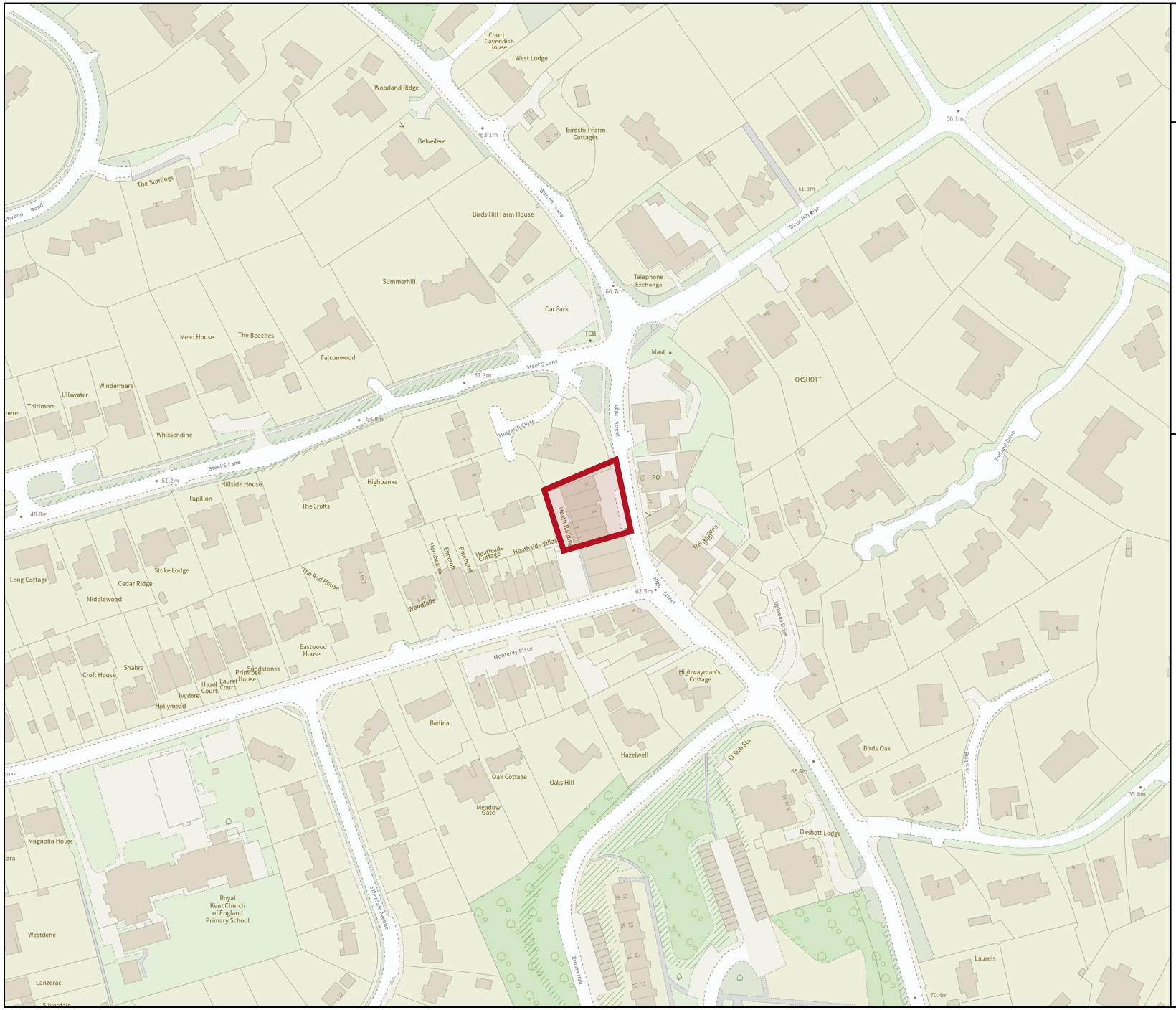
Notes

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 2021 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
21-168

Location (easting/northing)
514559/160507

Scale
1:2500

Created
3 Mar 2022 13:47

- Selected area
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

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