

Appendix E – Flood Risk Maps

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The following flood maps have been obtained from the Environment Agency flood map service at:

<https://flood-map-for-planning.service.gov.uk/>

This appendix contains the following sub-sections:

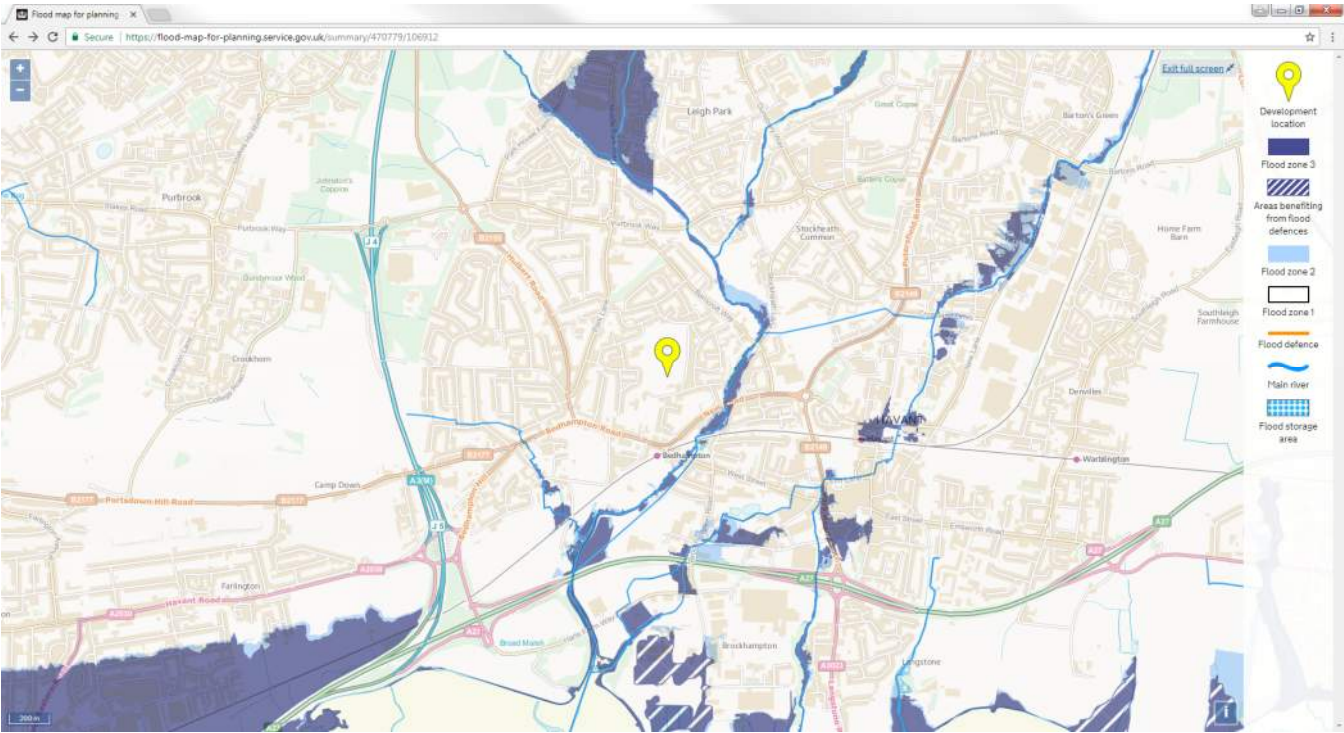
E.1 – Flood map for planning summary

E.2 – Flood risk from surface water, Environment Agency flood map extract.

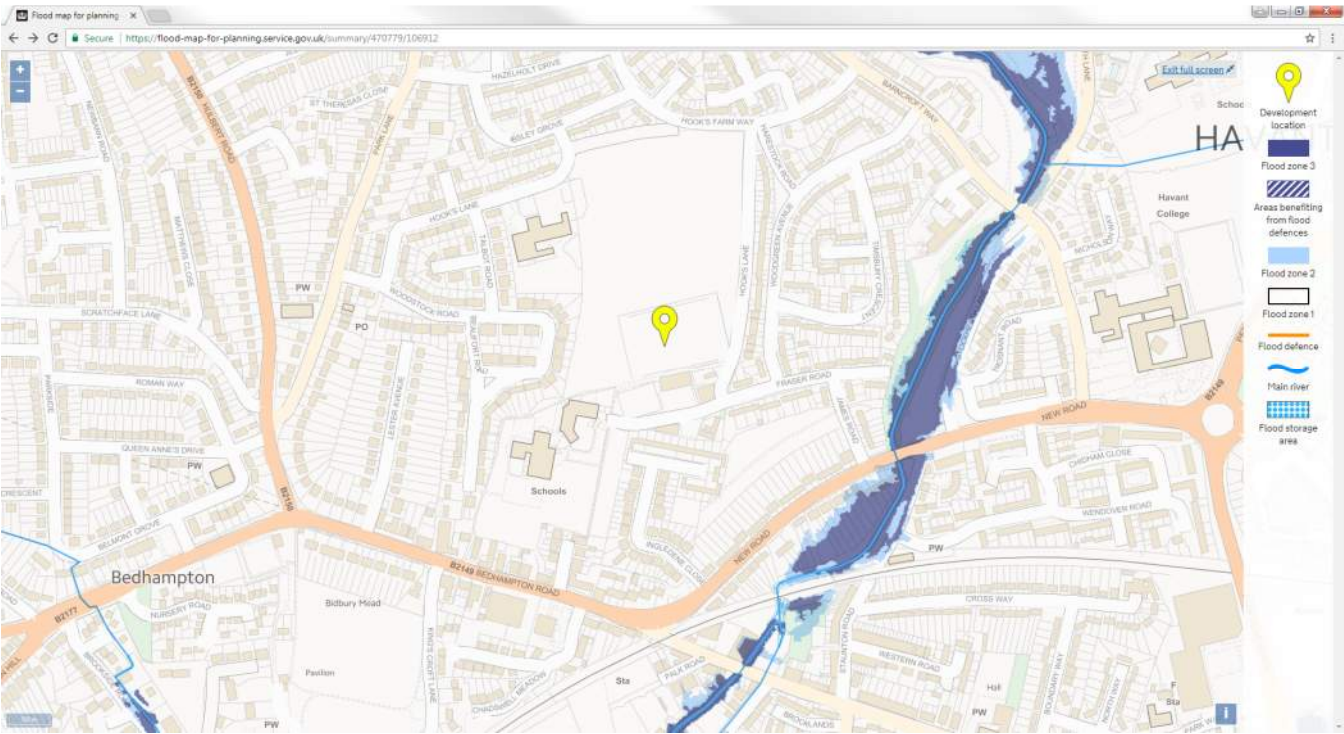
E.3 – Flood risk from groundwater, Environment Agency flood map extract.

E.4 – Flood risk from reservoirs, Environment Agency flood map extract.

E.1 – Flood map for planning summary

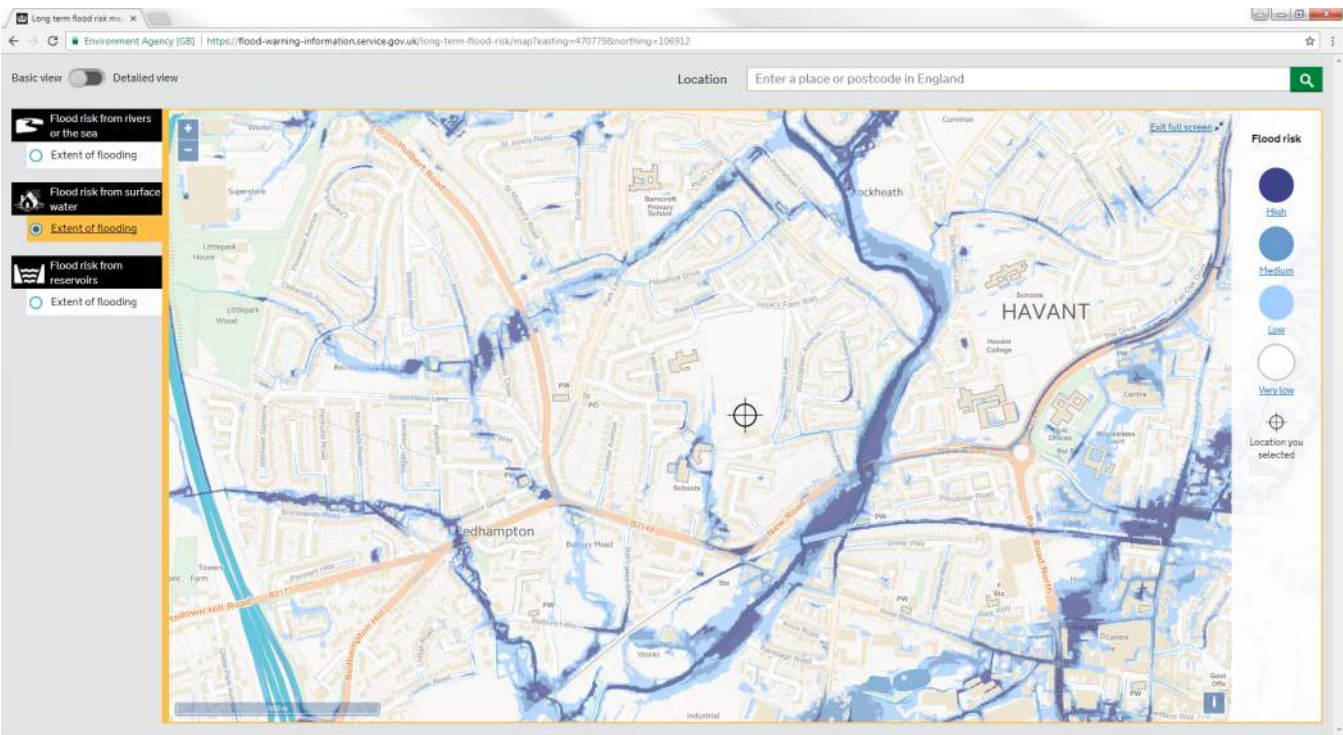


Overview 1

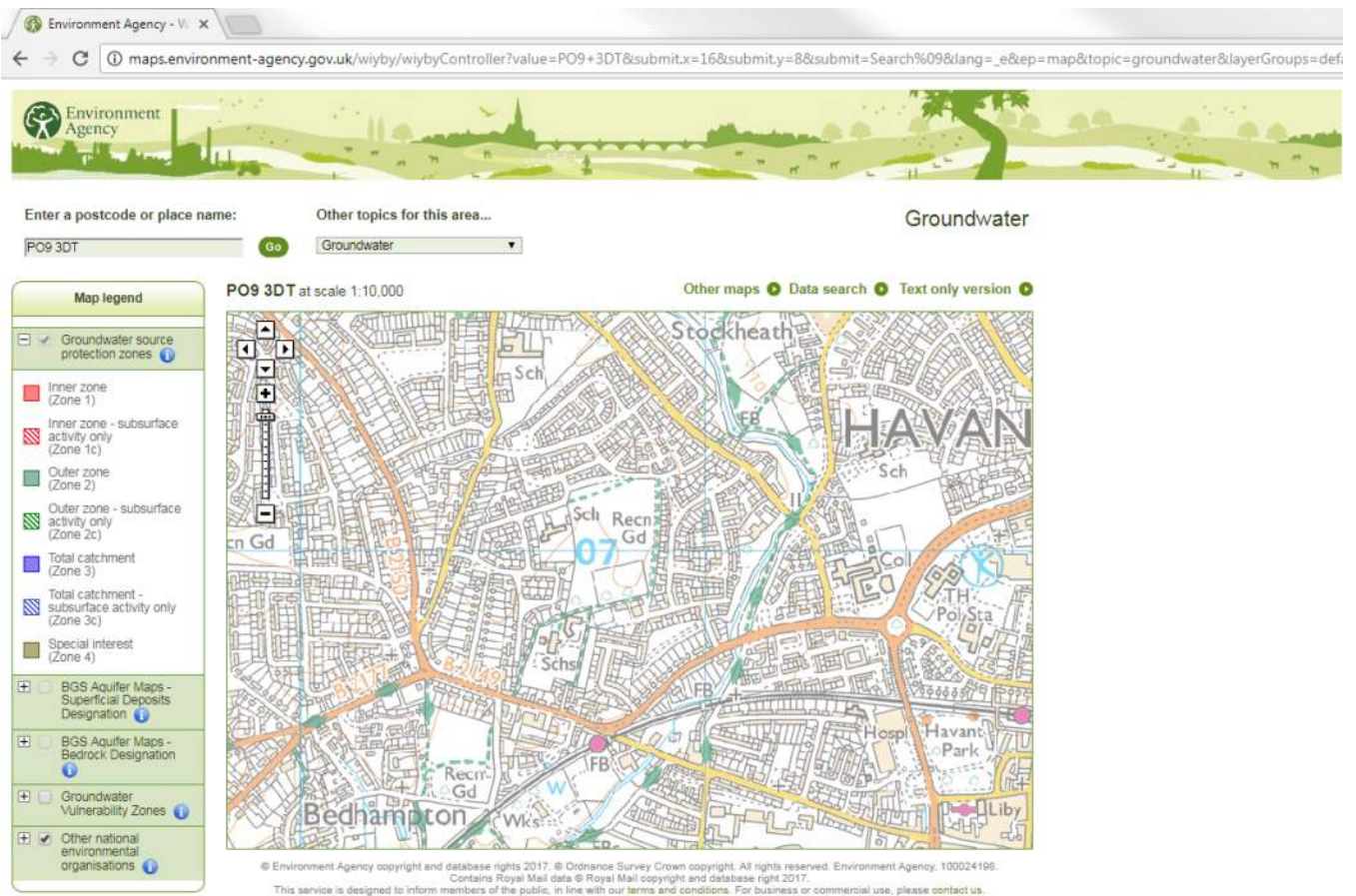


Overview 2

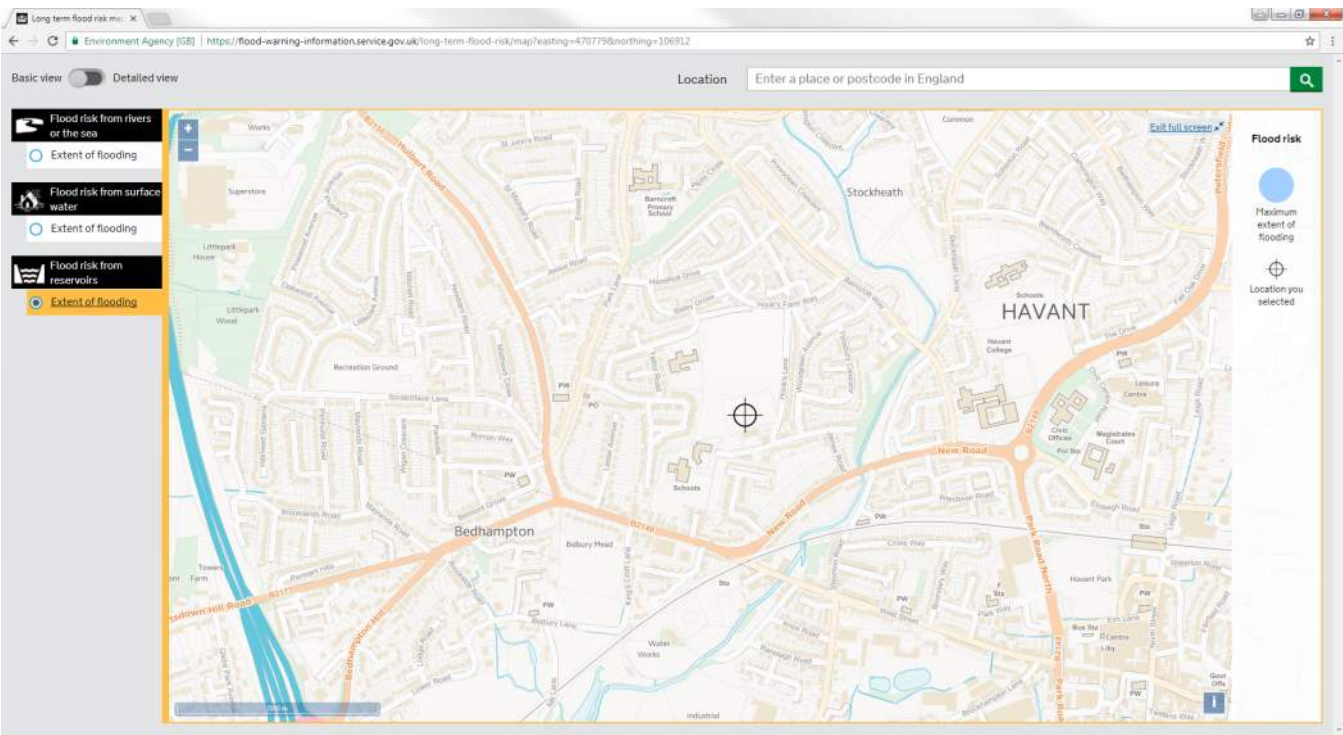
E.2 – Flood risk from surface, Environment Agency flood map extract.



E.3 – Flood risk from groundwater, Environment Agency flood map extract.



E.4 – Flood risk from reservoirs, Environment Agency flood map extract.



Appendix E – Flood Risk Maps

Flood map for planning

Your reference
Havant

Location
470779/106912

Created
21 Nov 2017 9:14

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

This means:

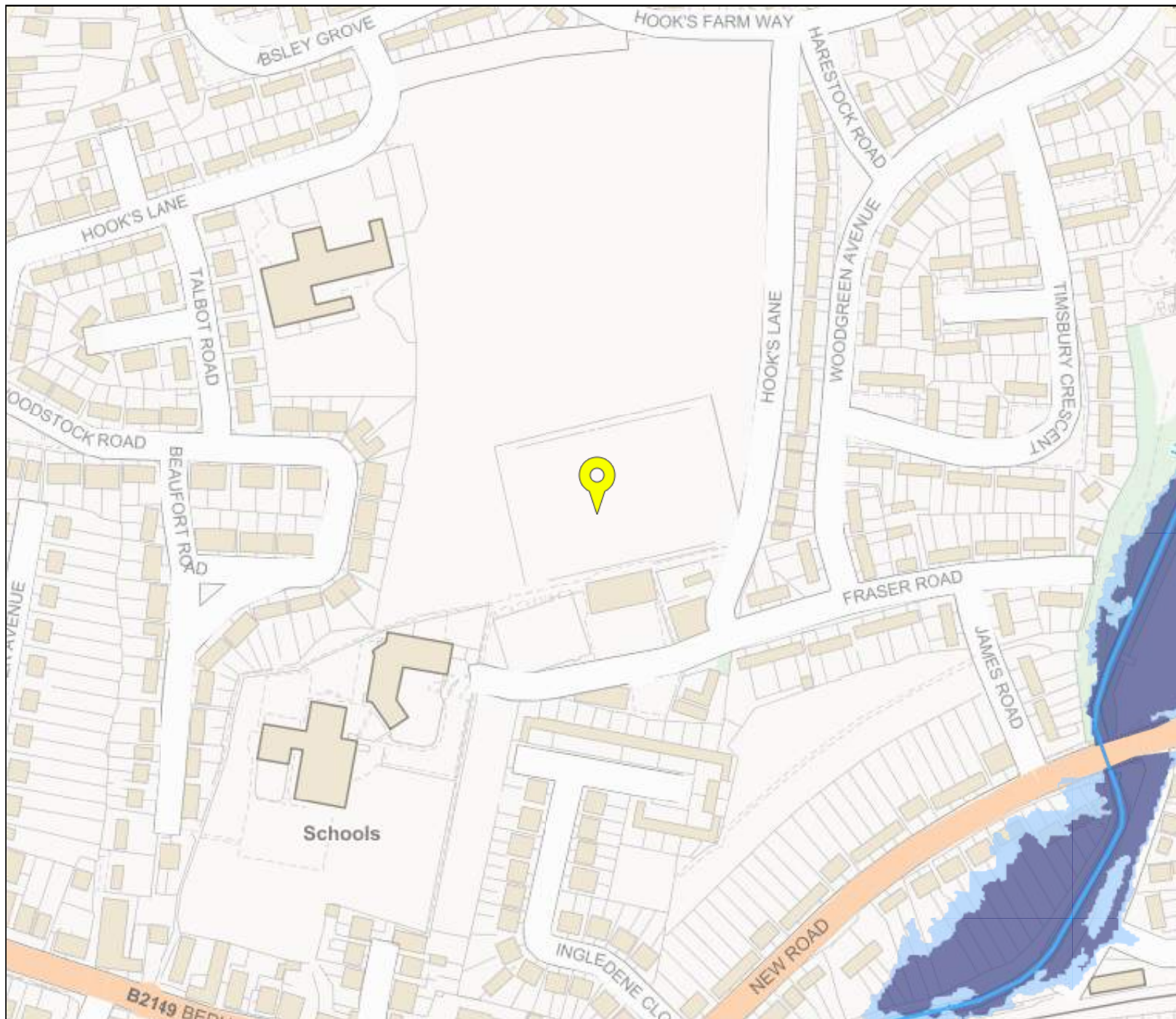
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage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

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
Havant

Location
470779/106912

Scale
1:3125

Created
21 Nov 2017 9:14

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



Appendix F – Existing Site Runoff Calculations

Hydrock Consultants Ltd		Page 1
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Date 27/11/2017 15:46	Designed by RyanJames	
File Havant RFC.srcx	Checked by	
XP Solutions	Source Control 2016.1	
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.400 Area (ha) 0.950 Urban 0.000 SAAR (mm) 725 Region Number Region 7 Results 1/s QBAR Rural 3.4 QBAR Urban 3.4 Q100 years 10.7 Q1 year 2.9 Q30 years 7.6 Q100 years 10.7		
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Appendix G – Proposed Surface Water Discharge Calculations



Date 11/12/2017 08:31

File Havant RFC.srxc

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Checked by

XP Solutions

Source Control 2016.1

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

Half Drain Time : 184 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	14.271	0.171	7.2	3.4	10.6	73.9	O K
30 min Summer	14.332	0.232	9.7	3.4	13.0	134.8	O K
60 min Summer	14.386	0.286	12.0	3.4	15.1	205.2	O K
120 min Summer	14.425	0.325	13.6	3.4	16.7	264.2	O K
180 min Summer	14.453	0.353	14.8	3.4	18.0	305.9	O K
240 min Summer	14.460	0.360	15.1	3.4	18.3	317.1	O K
360 min Summer	14.467	0.367	15.4	3.4	18.6	327.2	O K
480 min Summer	14.468	0.368	15.4	3.4	18.7	329.4	O K
600 min Summer	14.466	0.366	15.3	3.4	18.6	326.6	O K
720 min Summer	14.463	0.363	15.2	3.4	18.4	321.0	O K
960 min Summer	14.452	0.352	14.8	3.4	18.0	305.5	O K
1440 min Summer	14.428	0.328	13.7	3.4	16.8	268.0	O K
2160 min Summer	14.392	0.292	12.2	3.4	15.3	214.3	O K
2880 min Summer	14.361	0.261	10.9	3.4	14.1	171.1	O K
4320 min Summer	14.311	0.211	8.9	3.4	12.2	112.3	O K
5760 min Summer	14.274	0.174	7.3	3.4	10.7	75.9	O K
7200 min Summer	14.245	0.145	6.1	3.4	9.5	52.9	O K
8640 min Summer	14.223	0.123	5.2	3.4	8.5	38.1	O K
10080 min Summer	14.208	0.108	4.5	3.3	7.8	29.1	O K
15 min Winter	14.295	0.195	8.2	3.4	11.5	95.3	O K
30 min Winter	14.358	0.258	10.8	3.4	14.0	167.4	O K
60 min Winter	14.410	0.310	13.0	3.4	16.0	242.0	O K
120 min Winter	14.465	0.365	15.3	3.4	18.5	324.0	O K
180 min Winter	14.488	0.388	16.2	3.4	19.6	358.8	O K
240 min Winter	14.497	0.397	16.6	3.4	20.0	373.3	Flood Risk
360 min Winter	14.500	0.400	16.7	3.4	20.1	376.6	Flood Risk
480 min Winter	14.498	0.398	16.7	3.4	20.1	373.7	Flood Risk
600 min Winter	14.492	0.392	16.4	3.4	19.8	365.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	127.517	0.0	113.8	74
30 min Summer	85.701	0.0	189.2	84
60 min Summer	54.957	0.0	274.1	102
120 min Summer	34.010	0.0	342.9	136
180 min Summer	25.295	0.0	422.3	192
240 min Summer	20.351	0.0	462.2	232
360 min Summer	14.971	0.0	521.1	292
480 min Summer	12.028	0.0	563.9	358
600 min Summer	10.141	0.0	597.0	424
720 min Summer	8.817	0.0	624.5	490
960 min Summer	7.063	0.0	668.4	622
1440 min Summer	5.157	0.0	729.5	884
2160 min Summer	3.757	0.0	788.0	1264
2880 min Summer	2.997	0.0	825.2	1632
4320 min Summer	2.176	0.0	867.8	2348
5760 min Summer	1.731	0.0	887.2	3056
7200 min Summer	1.449	0.0	894.1	3760
8640 min Summer	1.255	0.0	894.2	4448
10080 min Summer	1.111	0.0	888.7	5160
15 min Winter	127.517	0.0	140.8	75
30 min Winter	85.701	0.0	228.2	85
60 min Winter	54.957	0.0	307.1	96
120 min Winter	34.010	0.0	424.4	146
180 min Winter	25.295	0.0	487.8	192
240 min Winter	20.351	0.0	534.7	240
360 min Winter	14.971	0.0	598.5	306
480 min Winter	12.028	0.0	646.9	378
600 min Winter	10.141	0.0	685.1	450



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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 E Outflow (l/s)	Max Volume (m³)	Status
720 min Winter	14.484	0.384	16.1	3.4	19.4	353.4	O K
960 min Winter	14.466	0.366	15.3	3.4	18.6	325.7	O K
1440 min Winter	14.428	0.328	13.7	3.4	16.8	268.3	O K
2160 min Winter	14.378	0.278	11.6	3.4	14.8	193.9	O K
2880 min Winter	14.336	0.236	9.9	3.4	13.2	139.8	O K
4320 min Winter	14.272	0.172	7.2	3.4	10.6	74.6	O K
5760 min Winter	14.229	0.129	5.4	3.4	8.8	41.8	O K
7200 min Winter	14.203	0.103	4.3	3.2	7.5	26.5	O K
8640 min Winter	14.189	0.089	3.7	2.7	6.5	19.7	O K
10080 min Winter	14.178	0.078	3.3	2.4	5.6	15.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
720 min Winter	8.817	0.0	716.6	524
960 min Winter	7.063	0.0	766.5	664
1440 min Winter	5.157	0.0	837.2	936
2160 min Winter	3.757	0.0	905.3	1324
2880 min Winter	2.997	0.0	950.0	1688
4320 min Winter	2.176	0.0	1003.8	2388
5760 min Winter	1.731	0.0	1031.9	3072
7200 min Winter	1.449	0.0	1045.7	3704
8640 min Winter	1.255	0.0	1052.2	4432
10080 min Winter	1.111	0.0	1052.5	5152



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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)	19.400	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Pipe Network

Volume in Pipe Network (m³)	18	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Green Roof

Area (m²)	9600	Evaporation (mm/day)	3
Depression Storage (mm)	7	Decay Coefficient	0.050

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:	From:	To:	From:	To:
0	4 0.174451	24	28 0.052544	48	52 0.015826	72	76 0.004767	96	100 0.001436
4	8 0.142828	28	32 0.043019	52	56 0.012957	76	80 0.003903	100	104 0.001175
8	12 0.116938	32	36 0.035221	56	60 0.010608	80	84 0.003195	104	108 0.000962
12	16 0.095741	36	40 0.028837	60	64 0.008685	84	88 0.002616	108	112 0.000788
16	20 0.078386	40	44 0.023609	64	68 0.007111	88	92 0.002142	112	116 0.000645
20	24 0.064177	44	48 0.019330	68	72 0.005822	92	96 0.001754	116	120 0.000528



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Model Details

Storage is Online Cover Level (m) 14.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.01800	Width (m)	114.0
Membrane Percolation (mm/hr)	1000	Length (m)	76.0
Max Percolation (l/s)	2406.7	Slope (1:X)	147.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	14.100	Cap Volume Depth (m)	0.300

Hydro-Brake Optimum® Outflow Control

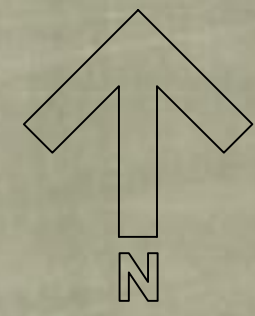
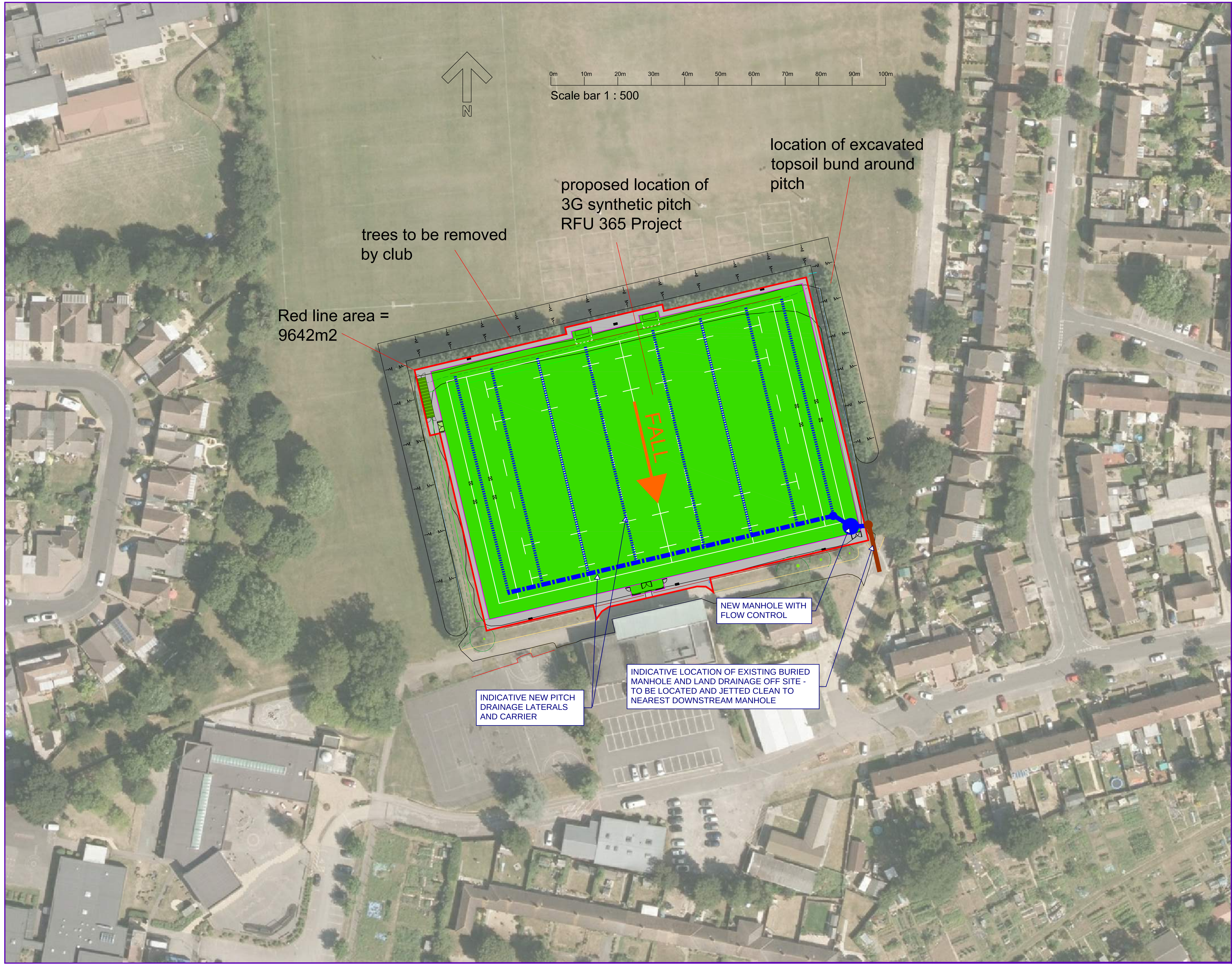
Unit Reference	MD-SHE-0096-3400-0400-3400
Design Head (m)	0.400
Design Flow (l/s)	3.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	14.100
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	3.4	Kick-Flo®	0.301	3.0
Flush-Flo™	0.147	3.4	Mean Flow over Head Range	-	2.8

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)	Depth (m)	Flow (l/s)
0.100	3.1	0.800	4.7	2.000	7.2	4.000	10.0	7.000	13.2
0.200	3.3	1.000	5.2	2.200	7.5	4.500	10.5	7.500	13.6
0.300	3.0	1.200	5.7	2.400	7.8	5.000	11.1	8.000	14.1
0.400	3.4	1.400	6.1	2.600	8.1	5.500	11.6	8.500	14.5
0.500	3.8	1.600	6.5	3.000	8.7	6.000	12.2	9.000	14.9
0.600	4.1	1.800	6.8	3.500	9.4	6.500	12.7	9.500	15.3

Appendix H – Off Site Drainage Works



0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m
Scale bar 1 : 500

location of excavated
topsoil bund around
pitch

proposed location of
3G synthetic pitch
RFU 365 Project

trees to be removed
by club

Red line area =
9642m2

FALL

NEW MANHOLE WITH
FLOW CONTROL

INDICATIVE NEW PITCH
DRAINAGE LATERALS
AND CARRIER

INDICATIVE LOCATION OF EXISTING BURIED
MANHOLE AND LAND DRAINAGE OFF SITE -
TO BE LOCATED AND JETTED CLEAN TO
NEAREST DOWNSTREAM MANHOLE