Scott White and Hookins

Scott White and Hookins LLP
Harman House
Andover Road
Winchester
Hampshire
SO23 7BS

T +44 (0)1962 844855
info@swh.co.uk

Flood Risk Assessment & Drainage Strategy Report

17 Haslemere Gardens, Hayling Island

Date: February 2022
Project No.: 303499
Revision: 00

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1.0 Introduction

1.1 Scott White and Hookins have been instructed by Mr Geoff Tournoff to undertake a flood risk assessment of a proposed development at 17 Haslemere Gardens, Hayling Island, PO11 9SD. This flood risk assessment has been produced as a supporting document for a planning application and takes the form of a desk study.

1.2 Currently the site comprises a concrete driveway and rear garden associated with property No:17 Haslemere Gardens. The garden includes a garage outbuilding and a static mobile home/caravan. The proposal is to remove the static mobile home and demolition of the outbuildings and to erect a single storey dwelling with amenity areas and parking. A location plan is provided in **Appendix A**. Proposed site plans are given in **Appendix C**.

1.3 This report considers the flood risk to the proposed development and the impact that the development will have in relation to flooding of adjacent areas and watercourses. It also considers any limits relating to flooding that are likely to be imposed to allow the development to be undertaken and recommends Sustainable Urban Drainage systems (SUDS) to control surface water runoff.

1.4 This report takes into account the requirements of NPPF and local policies and is based on information received from the Environment Agency web site and Southern Water.

1.5 Local planning policy is included within the Havant Borough Council Local Plan (Core Strategy) dated March 2011. Policy CS15 covers Flood and Coastal Erosion Risk and mentions that development will only be permitted where 1) It meets the sequential and exception test 2) The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment 3) The development will be safe without increasing flood risk elsewhere 4) The scheme incorporates flood protection, resilience and resistance measures 5) Appropriate flood warning and evacuation plans are in place 6) New site drainage systems are designed taking into account of events which exceed the normal design standard. See **Appendix M**.

1.6 This report is for the private and confidential use of the client and its agents and may not be copied in whole or in part without the written permission of Scott White and Hookins LLP.

2.0 Existing Site Conditions

2.1 The site is located at land the rear of 17 Haslemere Gardens, Hayling Island, PO11 9SD, centred on grid reference SZ 74524 98626, and is approximately 230m^2 ha in size (excluding existing drive). A location plan is given in **Appendix A**.

2.2 The site currently comprises a concrete driveway and rear garden associated with property No:17 Haslemere Gardens. The garden includes a garage outbuilding and a static mobile home/caravan. The site is surrounded by residential land use in all directions. An aerial view of the site is given in **Appendix A**.

2.3 A topographic survey of the site was carried out by Marvin and Partners Limited dated September 2021 (see drawing in **Appendix B**). The site generally falls to the east. Site levels range from 2.76m AOD at eastern edge of the existing driveway to 3.33m AOD at the north-west corner of the site near the location of the existing caravan.

2.4 It is assumed the site has no formal drainage infrastructure and drains into the ground or via overland flow towards Haslemere Gardens. The topographic survey shows there several foul manholes at the front and rear of Property No: 17 which appear to discharge to a public foul sewer in Haslemere Gardens as discussed in paragraph below.

2.4 Southern Water asset plans in **Appendix E** show no surface water sewers within the site or adjacent to the site. There nearest surface water sewer is located within Bosmere Road south-west of the site. There is a 150mm foul sewer which runs southwards in Haslemere Gardens.

2.5 The British Geological Survey records for the site indicate that the site is likely to be underlain by River Terrace Deposits comprising Sand, Silt and Clay. With respect to bedrock the site appears to be on the boundary between the Portsmouth Sand Member and Whitecliff Sand Member (undifferentiated) to the South and the London Clay Formation to comprising Clay, Silt and Sand to the north. See **Appendix H**. Based on the current information available infiltration drainage is likely to be suitable at the site. However, this assumption, will need to be confirmed through intrusive ground investigations.

2.6 The site in underlain by a secondary A bedrock aquifer and is not within Source Protection zone.

3.0 Potential Flood Risk Affecting the site

3.1 Fluvial Flooding

3.2.1 The nearest EA Main River is approximately 410m north of the site beyond the coastal defences which align the north edge of Hayling Island. It is therefore considered that the risk of fluvial flooding alone is negligible.

3.2 Tidal Flooding

3.2.1 Flood plain mapping available online provided by the Environment Agency (EA) indicates that the site lies in Flood Zone 3 due to the site's proximity to the sea. Flood Zone 3 is defined as comprising 'land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 greater annual probability of flooding from the sea (>0.5%) in any year. On this basis the site is considered to have a high risk of flooding from the sea. See extract of flood maps in **Appendix D**.

3.2.2 The Flood Map for Planning indicates the site benefits from defences. The EA were consulted with regards to flood data they possess for the site. There are defences north of the site, some of these which have a standard of protection of 1 in 200 years which will reduce the risk of flooding (see EA information in **Appendix G**). The site is there located in Flood Zone 3 'defended'.

3.2.3 They provided eleven flood levels within the site should a flood event occur. There are four flood levels within the proposed dwelling area. The maximum flood level within the proposed dwelling area is 3.37m AOD for the 0.5% annual probability tidal flood event and 3.54m AOD for the 0.1% annual probability tidal flood event.

3.2.4 No climate change flood levels were provided. The revised NPPF (2021) requires developers to consider flood risk in the future considering the effects of climate change. Climate change is anticipated to result in sea level rise. The EA have issued allowances for Sea Level rise, varying according to which part of the UK. Allowing for a 100 year lifetime for the development and taking into account the recommended sea level allowance for each epoch, a 1.065m sea level rise should be allowed for resulting in a flood level of 4.44m AOD for the 0.5% annual probability flood event including climate change (see calculations in **Appendix I**). The extreme 0.1% annual probability flood level is calculated to be 4.61m AOD.

3.2.5 The Partnership for Urban South Hampshire Strategic Flood Risk Assessment (SFRA) shows indicative hazard mapping of the areas at risk of fluvial and tidal flooding including an assessment of the flood hazard due to a breach (a combination of flood depth and flow velocity). The mapping indicates a large proportion of the site has a low hazard due to breach with a small proportion of the site having a moderate flood hazard.

3.3 Surface Water Flooding

3.3.1 The EA Surface Water Flood Map indicates the site has a very low risk of surface water flooding (see mapping in **Appendix D**) with overland flow confined to Haslemere Gardens where levels are up to 0.25m lower than site levels.

3.4 Groundwater Flooding

3.4.1 The SFRA indicates no groundwater flood incidents have occurred at the site or on Hayling Island itself. Based on a BGS Borehole log at Sparkes Boat Yard Company (Borehole Ref: SZ79NW117 — HAM 0252) located north of the site no groundwater was encountered up to 6m below ground level. It is considered the risk of flooding from groundwater is low.

3.5 Reservoir Flooding

3.5.1 EA flood maps show the site is not at risk of flooding from a reservoir failure.

3.6 Sewer Flooding

3.6.1 The SFRA indicates that there are no Southern Water records of sewer flooding at the site (see maps in **Appendix J**).

4.0 Flood Mitigation and Outline Drainage Proposals

4.1 Flood Mitigation

Ground Floor Levels

4.1.1 Standard requirements for ground floor levels of new development are set out in BS8533:2011 'Assessing and Managing Flood Risk in New Development – Code of Practice'. This recommends floor levels are set a minimum of 300mm above the modelled 0.5% annual probability plus allowance for climate change flood level.

4.1.2 The 0.5% annual probability plus allowance for climate change flood level is calculated to be 4.4m AOD. Given the area of the proposed building is 3.00m AOD is not considered practical to set the finished floor level of the proposed building at 4.70m AOD (1.7m higher than existing level). A pragmatic approach is needed. The current 0.1% annual probability flood level is 3.54m AOD. It is proposed therefore that the Finished floor level is set 300mm above this level, i.e. 3.84m AOD.

Site Levels

4.1.3 The private access road to the side of the existing property (17 Haslemere Gardens) which leads to the new dwelling should be typically set at 3.54mAOD but will need to ramp down to suit the existing levels at the front of the site.

Flood Resistant and Resilient Measures

4.1.4 Due to the residual risk to the pavilion, flood resistant and resilient measures could be incorporated in the construction of the development in line with the current recommendations from the Defra/EA document 'Improving the Flood Performance of New Buildings – Flood Resilient Construction'.

4.1.5 It is recommended that flood resistant/resilient measures are incorporated up to the 0.5% annual probability climate change tidal flood level of 4.44m AOD.

4.1.6 Flood resistant measures aim to keep flood water out of the building by providing barriers and incorporating low permeability measures in the wall and floors. Such measures include demountable defences, water resistant wall rendering, the sealing of ground level vents (e.g. using Ventguard, Ventseal or SmartBrick) and anti-flood valves fitted to all drainage runs exiting the building. Typically, flood resistance measures are effective up to a maximum flood depth of approximately 500mm.

4.1.7 Flood resilient measures are incorporated where it is accepted that, in severe flood events, water may enter parts of the building so it is necessary to ensure the building will remain useable after the floodwater has receded and the area has been cleaned.

Therefore, the key issue is to incorporate materials that retain their structural integrity and have good drying and cleaning properties (e.g. the use of suitable tiling over areas, with water resilient grout). It is also recommended that services are secured and sockets etc. are located with a suitable freeboard above the floor level.

4.1.8 Actual measures can be discussed and agreed with Building Control Officers during detailed design

Floodplain compensation

4.1.9 Whilst the site is located within Flood Zone 3, the site is considered to benefit from the coastal flood defences and is considered to be tidal, therefore the requirement for compensatory floodplain storage is negated.

Safe Access and Egress

4.1.10 It is necessary to consider and incorporate safe access arrangements as part of the mitigation, to ensure the users/occupants of the development are safe in times of flooding. A safe 'dry' access route should be provided from the door of the property to an area/location wholly outside of the 0.5% annual probability plus an allowance for climate change extent. It is not available for this site as the 0.5% annual probability flood level is higher than the whole site and surrounding area. Occupants would not be able to safely reach an area of no flooding unless they walked through flood water. This is not considered acceptable and in the event of flooding this would place additional strain on the emergency services. A flood warning and evacuation (FWEP) plan has therefore been developed (see **Appendix K**). The plan effectively sets out the emergency measures to be followed in the event of flooding (e.g. provision of safe refuge areas, evacuation route offsite).

4.1.11 Designing for Exceedance

Exceedance flow routes for storm events in excess of the 1 in 100 years + 40% Climate change event will be channelled around the building and along the driveway, which mimics the existing natural flows across the site.

4.2 Drainage

4.2.1 Based on the drainage hierarchy stated in paragraph 2.3 of **Appendix M**, the preferred method for disposal of surface water from the new development is via infiltration drainage.

4.2.2 Geological data for the site indicates that that the soil comprises Sand, Silt and Clay near the surface with either Sand or Clay bedrock beneath. The recorded geology suggests infiltration may be viable. An Intrusive Site Investigation will need to be carried out to confirm this assumption.

4.2.3 On the basis of the above the following drainage options are considered to be appropriate for this site:

Device	Description
Green roofs	Soft landscaping at roof level which slows surface water runoff.
Rain Gardens	Elements of landscaping designed to accommodate small areas of discharge close to source.
Infiltration devices & Soakaways	Attenuation of flows and allow water to percolate into the ground via natural infiltration. Forms can include chambers, cellular tanks and trenches.
Permeable surfaces	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate into permeable soils or discharge to sewers.
Rainwater harvesting	Reduces the annual average rate of runoff from the site by reusing water for non-potable uses e.g. toilet flushing.
Filter drains & perforated pipes	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration.
Attenuation Underground	Oversized pipes or geo-cellular tanks designed to store water below ground level.
Proprietary Treatment Systems	Petrol interceptors, silt traps and similar devices used as part of an overall SUDS scheme to provide pollution control prior to discharge.

- Infiltration techniques should be considered as the preferred option for disposal of surface water from the proposed development. A conservative infiltration rate of 2l/s was used in the absence of infiltration testing data.

- Preliminary design of permeable paving indicates that this will provide a suitable method for disposal of surface water from the roof of the proposed dwelling and hardstanding areas. The subbase of the car parking area is proposed to be 0.3m deep and provides a total storage volume of approximately 8m^3 and is sized to accommodate the 1 in 100 year storm including 40% allowance for climate change with no flooding. Permeable Paving is also proposed at the front of the existing property due to loss of private driveway to serve the new dwelling.

A proposed drainage layout drawing and associated calculations are enclosed in **Appendix F**.

4.2.4 Protection of groundwater from pollution is covered in Chapter 26 of CIRCA SuDS Manual C753. Due to the limited extent of the surface water catchment from the development i.e., rainwater from roofs and residential parking areas, we can utilise the "simple qualitative method" described in this chapter (cl. 26.7.1) where we may select

"SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index", Table 26.2 & 26.3 CIRIA refers.

Pollution Hazard (Indices method)				
Area	Pollution Hazard	TSS	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Low traffic roads and parking	Low	0.5	0.4	0.4

Note – Please see CIRIA SUDS manual for full descriptions.

Pollution Mitigation (Indices method) for discharge to groundwater			
Area			
Component	TSS	Metals	Hydro-carbons
Permeable pavement	0.7	0.6	0.7

Note – Please see CIRIA SUDS manual for full descriptions.

4.2.5 Rainwater from roofs is considered have a very low risk pollution risk (Table 26.2 CIRIA). However, to prevent any potential sediment from impacting the storage structure, Sediment Traps should be provided on the downpipes' outlet to the storage structure to prevent sedimentation, with rodding access provided either side for cleaning and maintenance.

4.2.6 Driveways and low traffic roads have a low risk of pollution. Permeable pavements offer sufficient pollution mitigation and are considered acceptable (Table 26.3 and 26.4 CIRIA).

4.2.7 To ensure drainage elements function correctly, maintenance of drainage should be covered by a suitable management company and subject to a regular maintenance regime. Maintenance of SuDS to be in accordance with CIRIA SuDS manual C753 where specific intervals are advised within the document as per element type. A summary of these are present in **Appendix L**.

4.2.8 Foul flow generated from the new dwelling is proposed to discharge to an existing foul sewer in Haslemere Gardens, subject to agreement with Southern Water.

5.0 Summary and Recommendations

5.1 The proposed development lies within Flood Risk Zone 3 as indicated on the Environment Agency flood map due to the site's proximity to the sea. On this basis the site is considered to be at a high risk of tidal flooding, however does benefit from coastal flood defences.

5.2 The proposed mitigation strategy demonstrates the development is safe through a number of measures as follows:

- Ground floor levels set at 3.84m AOD, 300mm above the current 0.1% annual probability tidal flood level.
- Flood Resistance/resilience measures up to the 0.5% annual probability tidal flood level plus climate change for the duration of the development of 4.44m AOD.
- Production of a Flood Warning and Evacuation Plan with sets out the emergency measures to be followed in the event of flooding.
- Exceedance flow routes for storm events in excess of the 1% annual probability flood event + 40% Climate change will be channelled around the building and along the existing driveway.

5.3 The surface water drainage strategy is infiltration into the ground via permeable paving, subject to infiltration testing results. It is proposed to discharge foul flow to the existing foul sewer in Haslemere Gardens, subject to agreement with Southern Water.

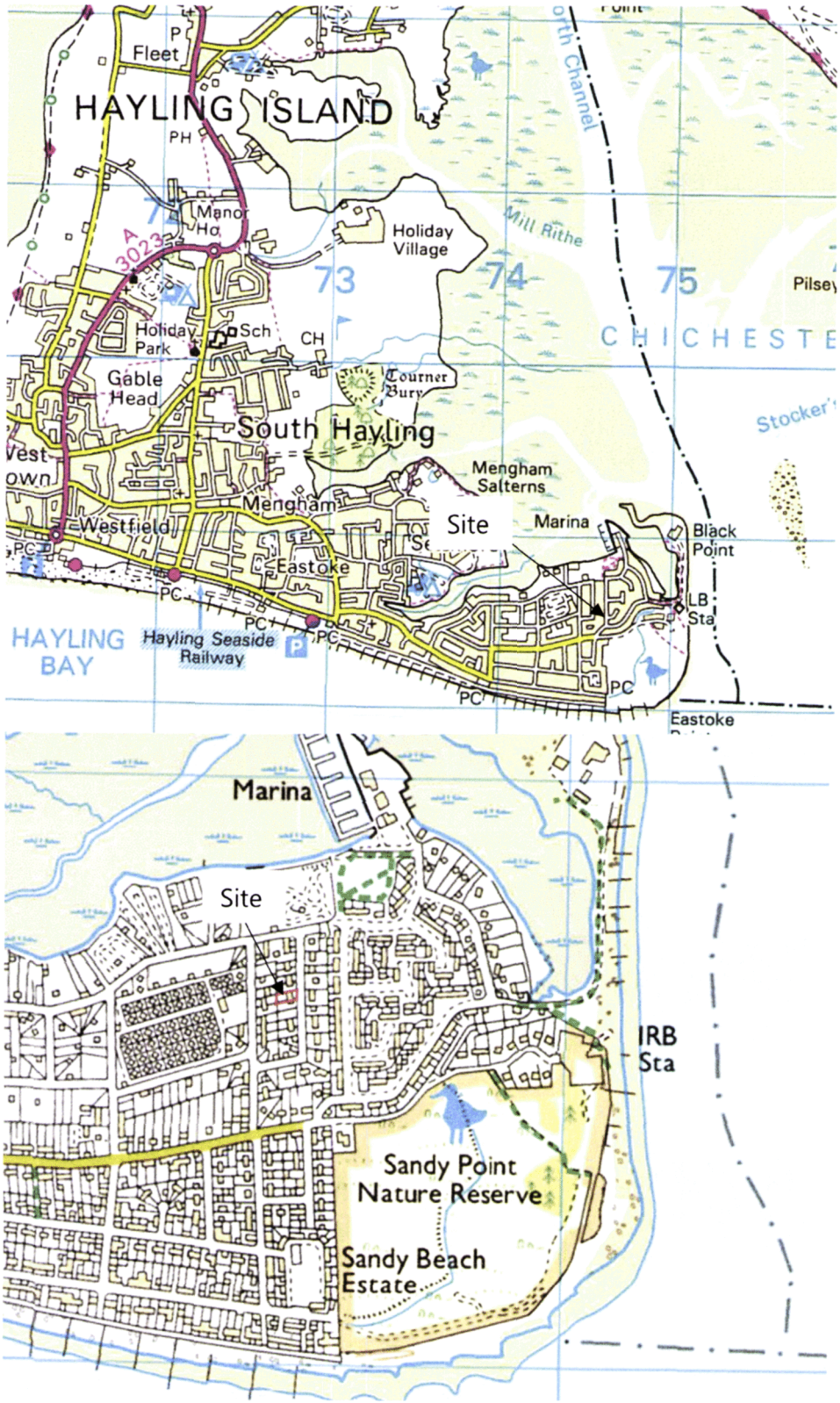
5.4 In conclusion, the future occupants and users of the proposed development will be safe from flooding and there will be no detrimental impact on third parties. The proposal complies with the National Planning Policy Framework (NPPF) and local planning policy with respect to flood risk and is an appropriate development at this location.

6.0 Appendices

A. Site Location Plan
B. Existing Topographic Survey
C. Proposed Site Plan
D. Flood Map Extract
E. Existing Sewer Record Drawings
F. Proposed Drainage Drawing and Calculations
G. EA Records and Correspondence
H. British Geological Survey Records
I. Climate Change Calculation
J. SFRA Extract
K. Flood Warning and Evacuation Plan
L. SW Drainage Maintenance Schedule
M. Local Drainage Planning Policy applicable to the development

Appendix A

Site Location Plan



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Aerial photograph of existing site

Appendix B
Existing Topographic Survey



1	474557.004	98646.575	2.784	Nail
2	474550.671	98629.550	2.676	Nail
3	474532.737	98625.528	2.783	Nail
4	474523.126	98633.903	2.842	Nail
5	474518.277	98624.118	3.071	Peg

Surveyed by: S Smith

Plotted by: S Brown

Drawn by: Acad

Legend

ACU Air Conditioning Unit
AV Air Valve
BC Barrier Control
BOL Bollard
BTB British Telecom Junction Box
BTMH British Telecom Manhole
CL Cover Level
CTV Cable TV
ELCP Electricity Cable Pit
EM Electricity Cable Marker
EP Electricity Pole
ER Earth Rod
FH Fire Hydrant
FP Flag Pole
G Gully
GV Gas Valve
IB Illuminated Bollard
IL Invert Level
JB Junction Box
LB Letter Box
LC Lamp Column
MH Manhole
MRK Concrete Marker
O/F Outfall
PM Parking Meter
RE Rodding Eye
RWP Rainwater Pipe
SC Stop Cock
SP Sign Post
SV Sluice Valve
TCB Telephone Kiosk
TL Traffic Light
TLC Traffic Light Cover
TM Ticket Machine
TP Telegraph Pole
UTR Unable To Raise
UTS Unable To Survey
VC Vent Column
WM Water Meter
WO Wash Out
WWP Waste Water Pipe

Data

i) Trees shown thus 9.6/200 indicates Ht. in metres/Span. dia in metres Trunk dia. in millimetres

ii) Trees shown thus 9.6x8/200 indicates Ht. in metres/Span. dia in metres Trunk dia. in millimetres

iii) Grid : Metric and oriented to north

Levels : Metric and based on OS GPS DATA

Situated on Survey station 1

Value: 2.784m

Client

Mrs S SHEA

Site

17 HASLEMERE GARDENS
HAYLING ISLAND

EXISTING SURVEY

Marvin & Partners Limited
Plestor House
Farnham Road
West Liss
Hampshire GU33 6JQ

Tel : 01428 751888
Email: paul@maplimited.com

Survey Notes

This survey was carried out in accordance with the specification guidelines in The RICS Surveys of Land, Buildings and Utility Surveys at Scales of 1:500 and Larger. Planimetric accuracies expected:
+/-30mm from survey control at 1/100
+/-60mm from survey control at 1/200
The scales quoted are at which the survey was carried out NOT at which it is reproduced. Any dimensions that require greater accuracy should be specifically measured on site.

Tree species are identified by use of reference books and whilst the surveyor has taken reasonable care to ensure that they are indentified correctly, Marvin & Partners recommend that an Arboriculturist should be commissioned if the species are critical to the project.

All drainage connectivity is done by visual inspection and soundings, and assumed to be a straight line between main entry points, unless it has been specifically requested that all connections to be proven on site by use of electrodetection.

All drainage details are recorded from the surface. No Confined Space entry by survey personnel.

Date	SEPT 2021
Scale	1/100 @ A2
Dwg/Job No.	21/5720
Checked By	

Appendix C
Proposed Site Plan



GROUND FLOOR PLANS AS PROPOSED.

DEVELOPMENT AT 17, HASCOMBE GARDENS HAYLING ISLAND. HAMPSHIRE PO11 9SD for Mrs S. SHEA.

SCALE: 1:100 @ A3
DATE: JANUARY 2020
DRAWING NUMBER 421-2

G.R. TOURNOFF. DIARCH. 55A, HEATH LANE FARNHAM SURREY. GU9 0AR 01252 716787

Appendix D
Flood Map Extracts

River and Sea Flooding



Flood Map For Planning

Flood risk from rivers or the sea

Low Probability (Flood Zone 1) means that each year this area has a chance of flooding of less than 0.1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Medium Probability (Flood Zone 2) means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

High Probability (Flood Zone 3) means that each year this area has a chance of flooding of greater than 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

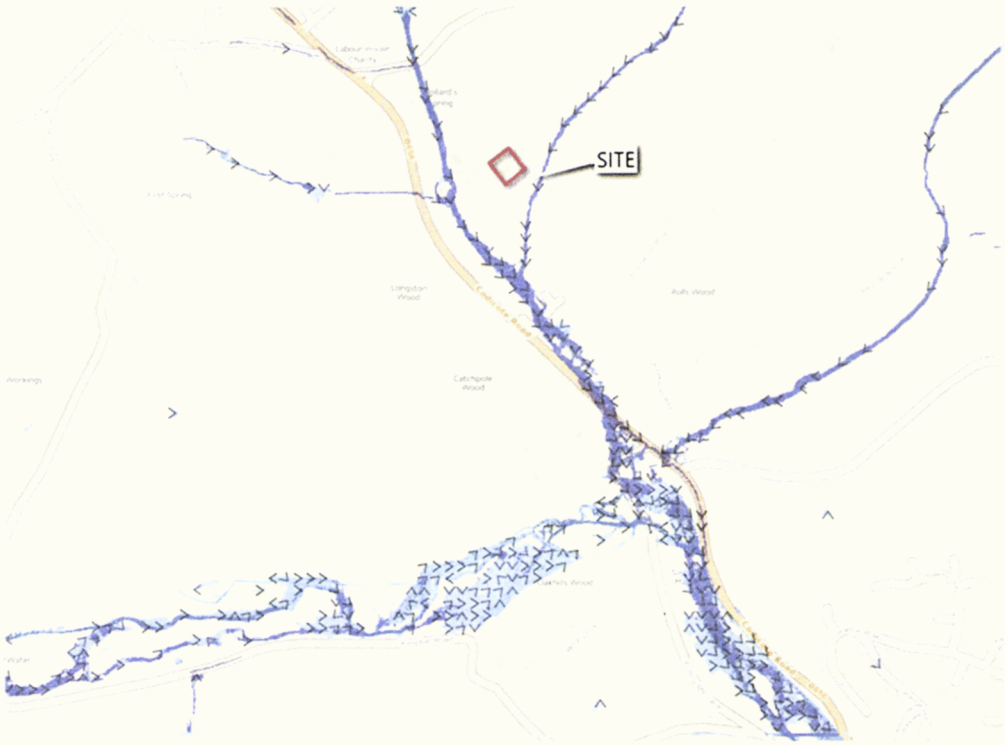
Surface Water Flooding



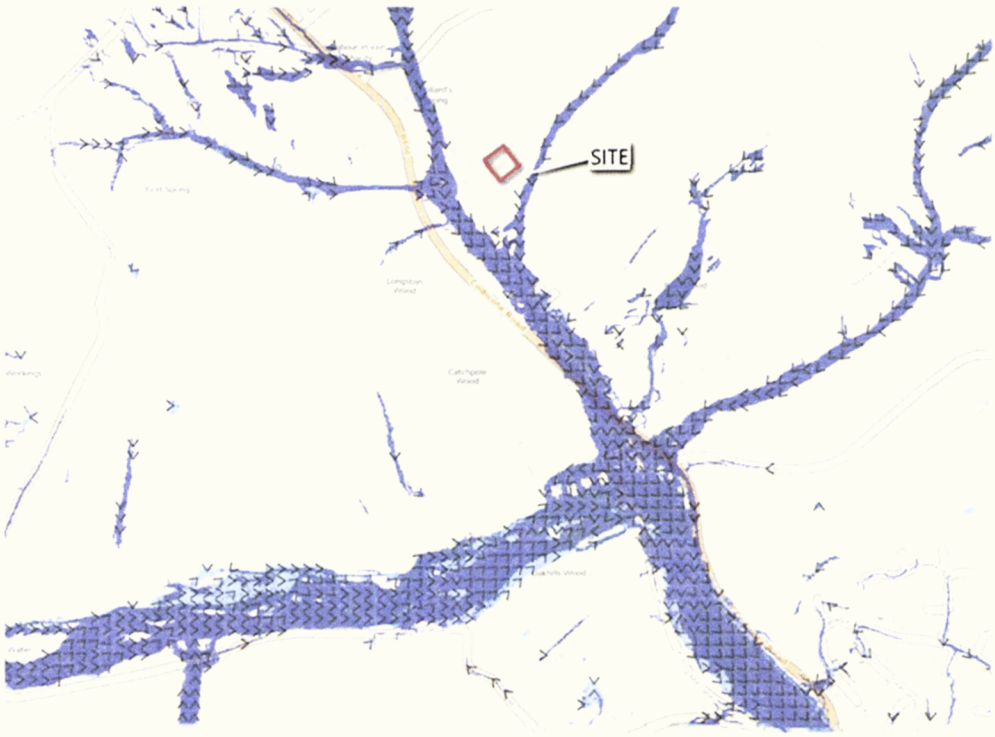
Flood Map – Surface Water (High Risk Depth)



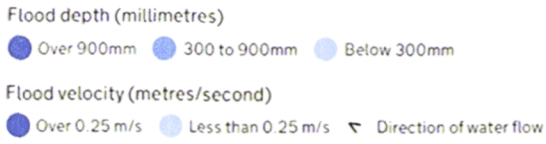
Flood Map – Surface Water (Low Risk Depth)



Flood Map – Surface Water (High Risk Velocity)



Flood Map – Surface Water (Low Risk Velocity)



Flood risk from surface water

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

High risk means that each year this area has a chance of flooding of greater than 3.3%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

Appendix E

Existing Sewer Record Drawings



(c) Crown copyright and database rights 2022 Ordnance Survey 100031673

Data updated: 17/01/22

Scale: 1:1250

Map Centre: 474498,98635

Date: 24/01/22

Our Ref: 763421 - 1

Wastewater Plan A3

Powered by digdat

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Decarcation Chamber Dummy Manhole or Surface Water Soakaway

tkillingback@swh.co.uk

Haslemere Gardens

WATER for LIFE

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 2022 Ordnance Survey 100031673 .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.

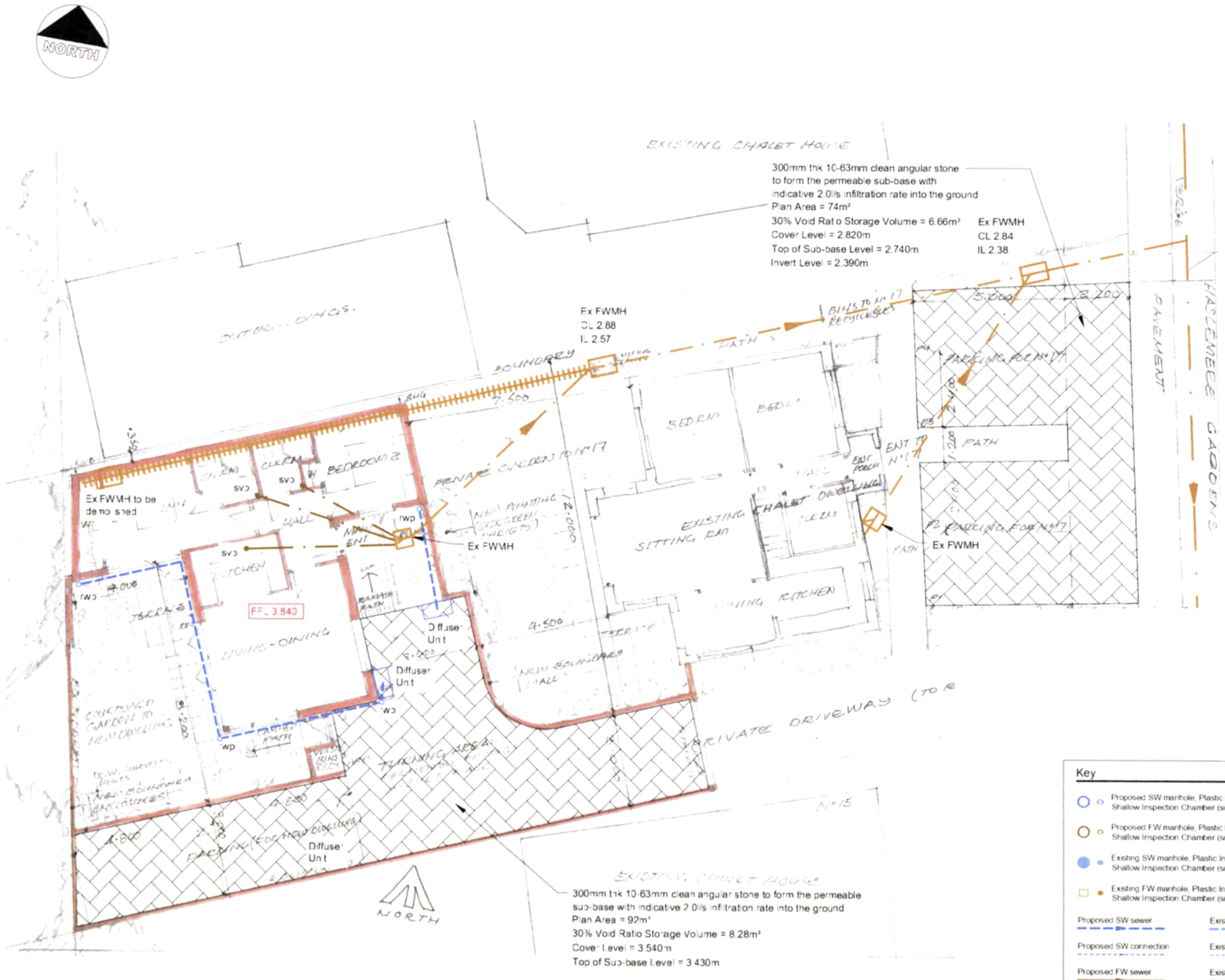
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
3501	F	3.71	2.36	
3702	F	2.97	1.61	
3703	F	2.98	1.46	
3704	F	2.69	2.16	
3705	F	3.07	1.70	
3706	F	3.08	1.65	
3707	F	3.01	1.57	
3708	F	3.21	1.24	
4402	F	0.00	0.00	
4501	F	3.34	-0.18	
4502	F	3.23	-0.35	
4503	F	3.54	1.97	
4504	F	0.00	0.00	
4601	F	3.06	0.19	
4701	F	3.13	1.12	
4702	F	3.12	0.95	
4703	F	3.07	2.62	
5501	F	2.78	0.28	
5601	F	2.74	1.03	
5602	F	2.80	0.76	
5701	F	2.79	1.46	
6402	F	2.79	-0.14	
6403	F	2.90	0.06	
6405	F	3.02	0.42	
6501	F	3.02	0.81	
6502	F	3.05	0.93	
6504	F	2.97	0.47	
6601	F	2.69	1.11	
6603	F	2.68	0.88	
6604	F	2.78	1.17	
6605	F	2.53	1.42	
6701	F	2.54	1.20	
6702	F	2.49	1.21	
6703	F	2.44	1.28	
6705	F	2.43	1.36	
6706	F	0.00	0.00	
4550	S	3.25	1.95	
4551	S	3.33	2.31	
6450	S	2.86	2.02	
6452	S	2.99	1.95	
6453	S	3.02	0.00	
6550	S	3.01	2.22	
6650	S	2.62	1.72	
6651	S	2.79	1.50	
6652	S	2.77	1.88	
6750	S	2.46	1.48	
6751	S	2.47	1.35	
6753	S	2.45	1.62	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Appendix F

Proposed Drainage Drawing and Calculations



Key

- Proposed SW manhole, Plastic Inspection Chamber (ppic) or Shallow Inspection Chamber (sic)
- Proposed FW manhole, Plastic Inspection Chamber (ppic) or Shallow Inspection Chamber (sic)
- Existing SW manhole, Plastic Inspection Chamber (ppic) or Shallow Inspection Chamber (sic)
- Existing FW manhole, Plastic Inspection Chamber (ppic) or Shallow Inspection Chamber (sic)
- Proposed SW sewer
- Existing SW sewer
- Proposed SW connection
- Existing SW connection
- Proposed FW sewer
- Existing FW sewer
- Proposed FW connection
- Existing FW connection
- Existing FW sewer to be demolished
- rwp — Rainwater downpipe
- svp/ss — Soil Vent Pipe / Stub Stack
- RE — Rodding eye
- Diffuser box
- 300mm thk 10-63mm clean angular stone to form permeable sub-base

Notes

GENERAL

- This drawing is to be read in conjunction with all relevant Engineers and Architects drawings and with the Specification.
- For setting out refer to Architects drawings.
- All dimensions are in millimetres and levels are in metres unless noted otherwise.
- Contractor to take all relevant dimensions on site. Any discrepancies to be advised to the Engineer.
- Contractor to check/scan for services prior to construction to avoid any damage during works.
- Existing utilities are shown as indicative and traced from asset records supplied by emapsite and Technics (Utility_Fast-track_725342_944774) dated, 23rd December 2021.
- Existing topographical survey and site layout plan supplied by AR Design Studio 23rd December 2021.

DRAINAGE

- Any information given on this drawing regarding existing services is believed to be correct. The contractor must check this information and determine the nature and location of other existing services from the various statutory authorities before commencing excavation works.
- Drainage works to be constructed in accordance with BS EN 752 and Approved Document H.
- All soft spots and unacceptable material encountered in drainage excavations is to be removed and replaced with granular material to the requirements of the building control officer.
- Pipes to be installed to manufacturers recommendations.
- Pipes under buildings to be laid to a fall of 1:40 minimum unless noted otherwise.
- Pipes outside buildings to be laid to a fall of 1:80 minimum for Foul water and 1:100 minimum for Surface water unless noted otherwise.
- Invert levels of RWPs and SVPs under building to be set 400-650mm below Finished Floor Level U.N.O.
- All pipes under buildings to run through masonry sleeper walls, above top of foundations U.N.O. Openings for pipes must not exceed 450mm wide and must have a 70mm deep precast lintel over, to match the sleeper wall thickness. Any openings wider than 450mm must be approved by SWH.
- Plastic plain wall pipes to be PVC-U to BS EN 1401-1, class SN4, with flexible joints, Kitemark certified. Structured wall plastic pipes to be to WIS 04-35-01, Kitemark certified.
- Clay pipes to be vitrified clay to BS EN 295-1, with flexible joints, Kitemark certified. Clayware pipes must be extra strength classification protected in accordance with the specified details.
- Concrete pipes to be precast concrete to BS 5911-1 and BS EN 1916, with flexible joints.
- Bedding of pipes to be in accordance with approved document H1.
- Rocker pipes with flexible joints are to be provided at a distance of 150mm and 750mm from the face of construction to manholes, where pipes pass above, below or through ground beams or foundations, at gully connections and soil stack ends.
- Manhole access covers are to be located at the outgoing side of manholes.
- Cover levels are to be fixed on site to suit finished levels. Covers and frames to BS EN124, Grade D to be used in areas subject to heavy vehicular loading, Grade C in areas subject to light vehicular loading and Grade B to be used elsewhere.
- All internal RWP to be provided with rodding access for maintenance.
- Invert levels of RWPs and linear drains outside buildings to be set above top of foundation O.N.O.

PRELIMINARY - NOT FOR CONSTRUCTION

Rev.	Amendment	Drn.	Chkd.	Appd.	Date
P01	Preliminary	RD	TK	IL	02.02.22

17 Haselmere Gardens, Hayling Island

Drainage Strategy

Scott White and Hookins
Structural Engineering | Civil Engineering | Sustainability and BREEAM | CDM Consultancy

Scale at A2 1: 100

303499-SWH-XX-XX-DR-C-0500-P01
Project | Originator | Zone | Level | Type | Role | Number | Rev

DO NOT SCALE FROM THIS DRAWING

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

Half Drain Time : 16 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m^3)	Status
15 min Summer	3.207	0.097	2.0	2.7	O K
30 min Summer	3.228	0.118	2.0	3.3	O K
60 min Summer	3.234	0.124	2.0	3.4	O K
120 min Summer	3.217	0.107	2.0	3.0	O K
180 min Summer	3.195	0.085	2.0	2.3	O K
240 min Summer	3.176	0.066	2.0	1.8	O K
360 min Summer	3.157	0.047	1.9	1.3	O K
480 min Summer	3.150	0.040	1.6	1.1	O K
600 min Summer	3.144	0.034	1.4	0.9	O K
720 min Summer	3.140	0.030	1.2	0.8	O K
960 min Summer	3.135	0.025	1.0	0.7	O K
1440 min Summer	3.129	0.019	0.7	0.5	O K
2160 min Summer	3.124	0.014	0.5	0.4	O K
2880 min Summer	3.121	0.011	0.4	0.3	O K
4320 min Summer	3.118	0.008	0.3	0.2	O K
5760 min Summer	3.116	0.006	0.2	0.2	O K
7200 min Summer	3.115	0.005	0.2	0.1	O K
8640 min Summer	3.115	0.005	0.2	0.1	O K
10080 min Summer	3.114	0.004	0.2	0.1	O K
15 min Winter	3.223	0.113	2.0	3.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m^3)	Time-Peak (mins)
15 min Summer	124.633	0.0	15
30 min Summer	83.789	0.0	24
60 min Summer	53.779	0.0	42
120 min Summer	33.337	0.0	74
180 min Summer	24.832	0.0	106
240 min Summer	20.006	0.0	134
360 min Summer	14.706	0.0	190
480 min Summer	11.818	0.0	250
600 min Summer	9.966	0.0	310
720 min Summer	8.665	0.0	370
960 min Summer	6.943	0.0	492
1440 min Summer	5.071	0.0	734
2160 min Summer	3.696	0.0	1096
2880 min Summer	2.949	0.0	1468
4320 min Summer	2.142	0.0	2188
5760 min Summer	1.705	0.0	2848
7200 min Summer	1.427	0.0	3576
8640 min Summer	1.235	0.0	4264
10080 min Summer	1.093	0.0	4968
15 min Winter	124.633	0.0	15

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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 Volume (m³)	Status
30 min Winter	3.245	0.135	2.0	3.7	Flood Risk
60 min Winter	3.247	0.137	2.0	3.8	Flood Risk
120 min Winter	3.214	0.104	2.0	2.9	O K
180 min Winter	3.181	0.071	2.0	2.0	O K
240 min Winter	3.160	0.050	2.0	1.4	O K
360 min Winter	3.148	0.038	1.5	1.0	O K
480 min Winter	3.141	0.031	1.2	0.9	O K
600 min Winter	3.136	0.026	1.0	0.7	O K
720 min Winter	3.133	0.023	0.9	0.6	O K
960 min Winter	3.128	0.018	0.7	0.5	O K
1440 min Winter	3.124	0.014	0.5	0.4	O K
2160 min Winter	3.120	0.010	0.4	0.3	O K
2880 min Winter	3.118	0.008	0.3	0.2	O K
4320 min Winter	3.116	0.006	0.2	0.2	O K
5760 min Winter	3.115	0.005	0.2	0.1	O K
7200 min Winter	3.114	0.004	0.1	0.1	O K
8640 min Winter	3.113	0.003	0.1	0.1	O K
10080 min Winter	3.113	0.003	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	83.789	0.0	25
60 min Winter	53.779	0.0	44
120 min Winter	33.337	0.0	80
180 min Winter	24.832	0.0	108
240 min Winter	20.006	0.0	132
360 min Winter	14.706	0.0	192
480 min Winter	11.818	0.0	252
600 min Winter	9.966	0.0	310
720 min Winter	8.665	0.0	374
960 min Winter	6.943	0.0	498
1440 min Winter	5.071	0.0	742
2160 min Winter	3.696	0.0	1104
2880 min Winter	2.949	0.0	1472
4320 min Winter	2.142	0.0	2200
5760 min Winter	1.705	0.0	2808
7200 min Winter	1.427	0.0	3536
8640 min Winter	1.235	0.0	4248
10080 min Winter	1.093	0.0	4944

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Model Details

Storage is Online Cover Level (m) 3.540

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.15500	Width (m)	9.6
Membrane Percolation (mm/hr)	1000	Length (m)	9.6
Max Percolation (l/s)	25.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.110	Membrane Depth (m)	0

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

Half Drain Time : 16 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m^3)	Status
15 min Summer	2.499	0.109	2.0	2.7	O K
30 min Summer	2.522	0.132	2.0	3.3	Flood Risk
60 min Summer	2.526	0.136	2.0	3.4	Flood Risk
120 min Summer	2.505	0.115	2.0	2.8	O K
180 min Summer	2.480	0.090	2.0	2.2	O K
240 min Summer	2.459	0.069	2.0	1.7	O K
360 min Summer	2.438	0.048	1.9	1.2	O K
480 min Summer	2.430	0.040	1.6	1.0	O K
600 min Summer	2.424	0.034	1.4	0.8	O K
720 min Summer	2.420	0.030	1.2	0.7	O K
960 min Summer	2.415	0.025	1.0	0.6	O K
1440 min Summer	2.408	0.018	0.7	0.5	O K
2160 min Summer	2.404	0.014	0.6	0.3	O K
2880 min Summer	2.401	0.011	0.4	0.3	O K
4320 min Summer	2.398	0.008	0.3	0.2	O K
5760 min Summer	2.396	0.006	0.3	0.2	O K
7200 min Summer	2.395	0.005	0.2	0.1	O K
8640 min Summer	2.395	0.005	0.2	0.1	O K
10080 min Summer	2.394	0.004	0.2	0.1	O K
15 min Winter	2.516	0.126	2.0	3.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m^3)	Time-Peak (mins)
15 min Summer	124.633	0.0	15
30 min Summer	83.789	0.0	24
60 min Summer	53.779	0.0	42
120 min Summer	33.337	0.0	74
180 min Summer	24.832	0.0	104
240 min Summer	20.006	0.0	134
360 min Summer	14.706	0.0	188
480 min Summer	11.818	0.0	248
600 min Summer	9.966	0.0	308
720 min Summer	8.665	0.0	370
960 min Summer	6.943	0.0	490
1440 min Summer	5.071	0.0	734
2160 min Summer	3.696	0.0	1088
2880 min Summer	2.949	0.0	1432
4320 min Summer	2.142	0.0	2200
5760 min Summer	1.705	0.0	2856
7200 min Summer	1.427	0.0	3592
8640 min Summer	1.235	0.0	4280
10080 min Summer	1.093	0.0	5040
15 min Winter	124.633	0.0	15

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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 Volume (m^3)	Status
30 min Winter	2.540	0.150	2.0	3.7	Flood Risk
60 min Winter	2.540	0.150	2.0	3.7	Flood Risk
120 min Winter	2.501	0.111	2.0	2.8	O K
180 min Winter	2.463	0.073	2.0	1.8	O K
240 min Winter	2.440	0.050	2.0	1.2	O K
360 min Winter	2.428	0.038	1.5	0.9	O K
480 min Winter	2.421	0.031	1.2	0.8	O K
600 min Winter	2.416	0.026	1.1	0.6	O K
720 min Winter	2.413	0.023	0.9	0.6	O K
960 min Winter	2.408	0.018	0.7	0.4	O K
1440 min Winter	2.403	0.013	0.5	0.3	O K
2160 min Winter	2.400	0.010	0.4	0.2	O K
2880 min Winter	2.398	0.008	0.3	0.2	O K
4320 min Winter	2.396	0.006	0.2	0.1	O K
5760 min Winter	2.395	0.005	0.2	0.1	O K
7200 min Winter	2.394	0.004	0.2	0.1	O K
8640 min Winter	2.393	0.003	0.1	0.1	O K
10080 min Winter	2.393	0.003	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m^3)	Time-Peak (mins)
30 min Winter	83.789	0.0	25
60 min Winter	53.779	0.0	44
120 min Winter	33.337	0.0	78
180 min Winter	24.832	0.0	108
240 min Winter	20.006	0.0	130
360 min Winter	14.706	0.0	190
480 min Winter	11.818	0.0	250
600 min Winter	9.966	0.0	314
720 min Winter	8.665	0.0	368
960 min Winter	6.943	0.0	490
1440 min Winter	5.071	0.0	736
2160 min Winter	3.696	0.0	1064
2880 min Winter	2.949	0.0	1456
4320 min Winter	2.142	0.0	2168
5760 min Winter	1.705	0.0	2832
7200 min Winter	1.427	0.0	3632
8640 min Winter	1.235	0.0	4304
10080 min Winter	1.093	0.0	5104

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Model Details

Storage is Online Cover Level (m) 2.820

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.17500	Width (m)	7.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	22.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.390	Membrane Depth (m)	0

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Appendix G

EA Records and Correspondence

Flood Map for Planning (Rivers and Sea) - Centred on Haslemere Gardens, PO11 9SD - Created 6 December 2021



Environment Agency

1: 10,000

0 Metres 250

N W E S

Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occuring each year.

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Levels Map Centred on Haslemere Gardens, PO11 9SD - Created 6 December 2021



Environment Agency

Legend

Location_Point

Water Depth

Value

- High : 26.817
- Low : 1.93721e-006

Ground Level

Value

- High : 18.1244
- Low : -23.2942

1:600 *

*when printed at A4.

N

0 10 20

Metres

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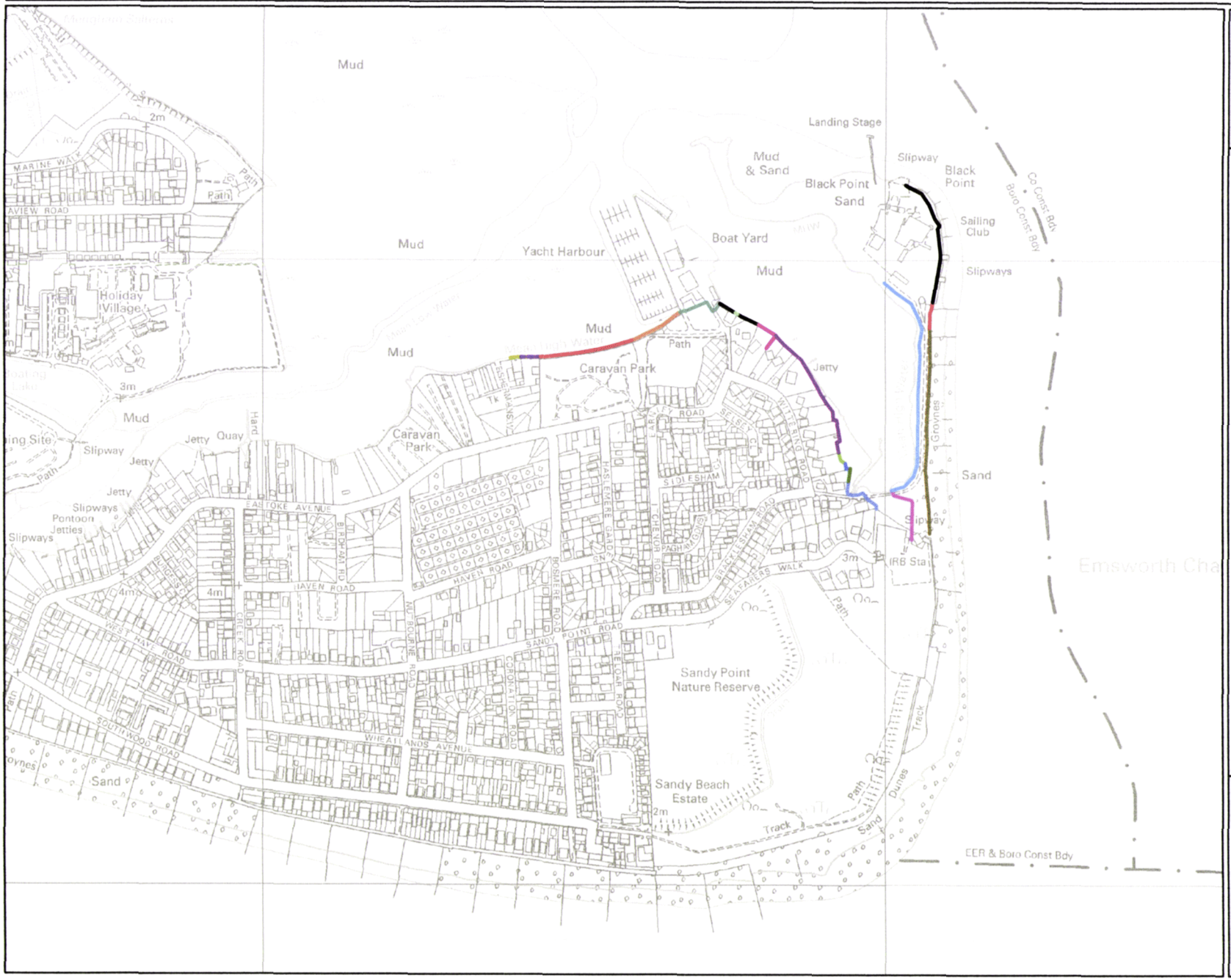
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Water Depths & Levels for Haslemere Gardens, PO11 9SD

	Water Surface Level (mAOD*)			Water Depth (metres)	
Point	0.5% Annual Probability/1 in 200 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year Present Day (Flood Zone 2)	Ground Level	0.5% Annual Probability/1 in 200 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year Present Day (Flood Zone 2)
1	3.37	3.54	2.93	0.44	0.61
2	3.36	3.54	2.98	0.38	0.56
3	3.36	3.54	2.80	0.56	0.74
4	3.36	3.54	2.81	0.55	0.73
5	3.36	3.54	2.82	0.54	0.72
6	3.36	3.54	2.79	0.57	0.75
7	3.36	3.54	2.79	0.57	0.75
8	3.36	3.54	2.79	0.57	0.75
9	3.36	3.54	2.79	0.57	0.75
10	3.36	3.54	2.73	0.63	0.81
11	3.36	3.54	2.76	0.60	0.78

* Levels in metres above Ordnance Datum Newlyn

Defence map Centred on Haslemere Gardens, PO11 9SD - Created 6 December 2021



Legend

ASSET_ID		ASSET_ID	
180204	147335	44206	184546
332751	147336	44207	185639
470260	147337	97418	185640
470262	180202		185641
470265	180203		
470270	180386		
470271	184543		
470278	184544		
	184545		

1:8,900 *

*when printed at A4.

N

0 175 350

Metres

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Asset Id	Asset Sub-type	Length (m)	Protection Type	Actual Condition	Standard of Protection (Years)	Last Inspection Date
147335	flood_gate	5.86	coastal	Good	No Data	08/12/2020
147336	flood_gate	5.55	coastal	Good	No Data	08/12/2020
147337	flood_gate	4.71	coastal	Fair	No Data	08/12/2020
180386	wall	80.8	tidal	Good	100	28/09/2020
180202	embankment	21.82	tidal	Good	100	28/09/2020
180203	wall	16.18	tidal	Good	100	28/09/2020
44206	flood_gate	4.36	coastal	Good	No Data	08/12/2020
44207	flood_gate	3.72	coastal	Good	No Data	08/12/2020
184543	wall	11.43	coastal	Fair	200	08/12/2020
184544	wall	20.26	coastal	Fair	200	08/12/2020
184545	wall	154.55	coastal	Fair	200	08/12/2020
184546	wall	86.33	coastal	Fair	100	08/12/2020
185639	wall	73.44	coastal	Fair	200	08/12/2020
185640	wall	65.61	coastal	Fair	200	08/12/2020
185641	embankment	57.96	coastal	Fair	200	08/12/2020
97418	flood_gate	4.92	coastal	Good	No Data	08/12/2020
470271	embankment	101.64	coastal	No Data	No Data	No Data
470260	beach	329.88	coastal	No Data	No Data	No Data
470270	embankment	380.07	coastal	No Data	No Data	No Data
332751	flood_gate	5	coastal	Good	No Data	28/09/2020
470278	high_ground	229.51	coastal	No Data	No Data	No Data
470262	beach	42.23	coastal	No Data	No Data	No Data
470265	quay	211.9	coastal	No Data	No Data	No Data
180204	wall	20.35	coastal	Good	100	28/09/2020

Risk of flooding from Surface Water - Centred on Haslemere Gardens, PO11 9SD - Created 6 December 2021



Environment Agency

1: 10,000

0 Metres 250

N W E S

Likelihood of flooding from Surface Water

- High (>=3.3%)
- Medium (3.3% - 1%)
- Low (1% - 01%)
- Very Low
- Flood Extent 1 in 30
- Flood Extent 1 in 100
- Flood Extent 1 in 1000

Likelihood of flooding from Surface Water

High:	Greater than or equal to 3.3% (1 in 30) chance in any given year
Medium:	Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
Low:	Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
Very Low:	Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on GOV.UK.

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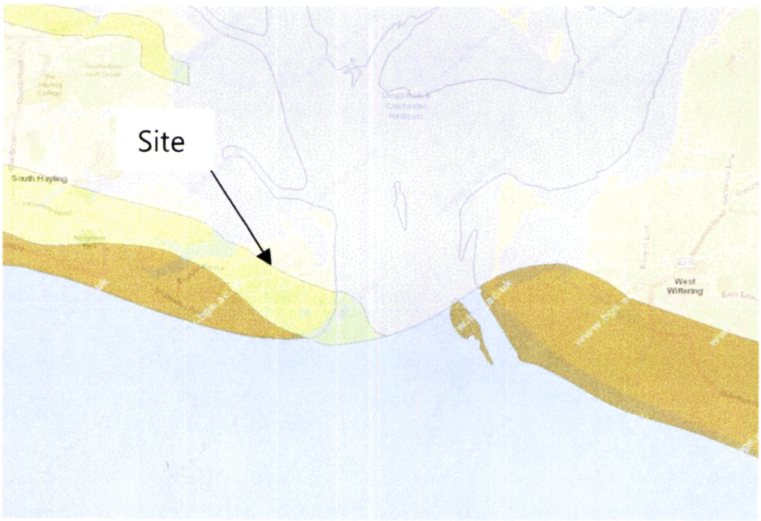
Appendix H

British Geological Survey Records



Superficial deposits

- BLOWN SAND - SAND
- BEACH AND TIDAL FLAT DEPOSITS (UNDIFFERENTIATED) - CLAY, SILT, SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- RAISED BEACH DEPOSITS, 1 - SAND AND GRAVEL
- RAISED MARINE DEPOSITS - SAND AND GRAVEL
- RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - SAND, SILT AND CLAY
- STORM BEACH DEPOSITS - GRAVEL



Bedrock geology

- LONDON CLAY FORMATION - CLAY, SILT AND SAND
- WITTERING FORMATION - SAND, SILT AND CLAY
- BOGNOR SAND MEMBER - SAND
- EARNLEY SAND FORMATION AND MARSH FARM FORMATION (UNDIFFERENTIATED) - SAND, SILT AND CLAY
- LAMBETH GROUP - CLAY, SILT AND SAND
- PORTSMOUTH SAND MEMBER AND WHITECLIFF SAND MEMBER (UNDIFFERENTIATED) - SAND

Extract of British Geological Survey

Appendix I

Climate Change Tidal Flood Level Calculation

Sea level allowances

Source of data:
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Table 2: sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline) – the total sea level rise for each epoch is in brackets

Area of England (Use River Basin)	2000- 2035 (mm)	2036 - 2065 (mm	2066-2095 (mm	2096-2125 (mm)
South East	5.7	8.7	11.6	13.1

Higher Central

Base Year 2018-2035 @ 5.7mm/year (18 years x5.7mm) = 102.6mm

2036-2065 @ 8.7mm/year (30 years x 8.7mm) = 261mm

2066-2095 @11.6mm/year (30 years x11.6mm) = 348mm

2096-2122 @13.1mm/year (27 years x 13.1mm) =353.7mm

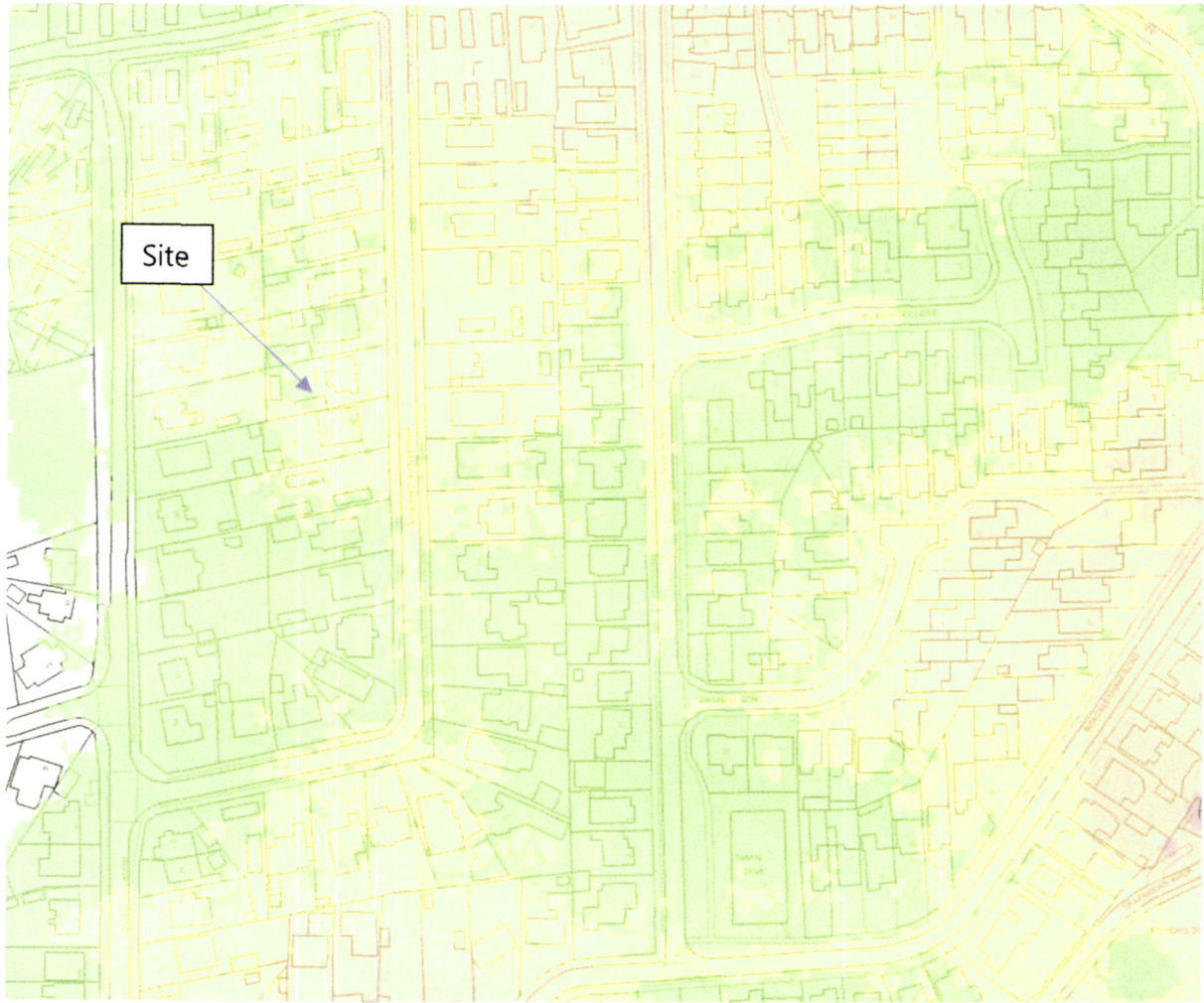
Overall total = 1065.3mm/1.065m rise

Baseline flood level (max flood level in area of proposed dwelling) present day at F0.5% (1 in 200) = 3.37m AOD and for year 2122 = 4.44m AOD

Appendix J
SFRA Extracts

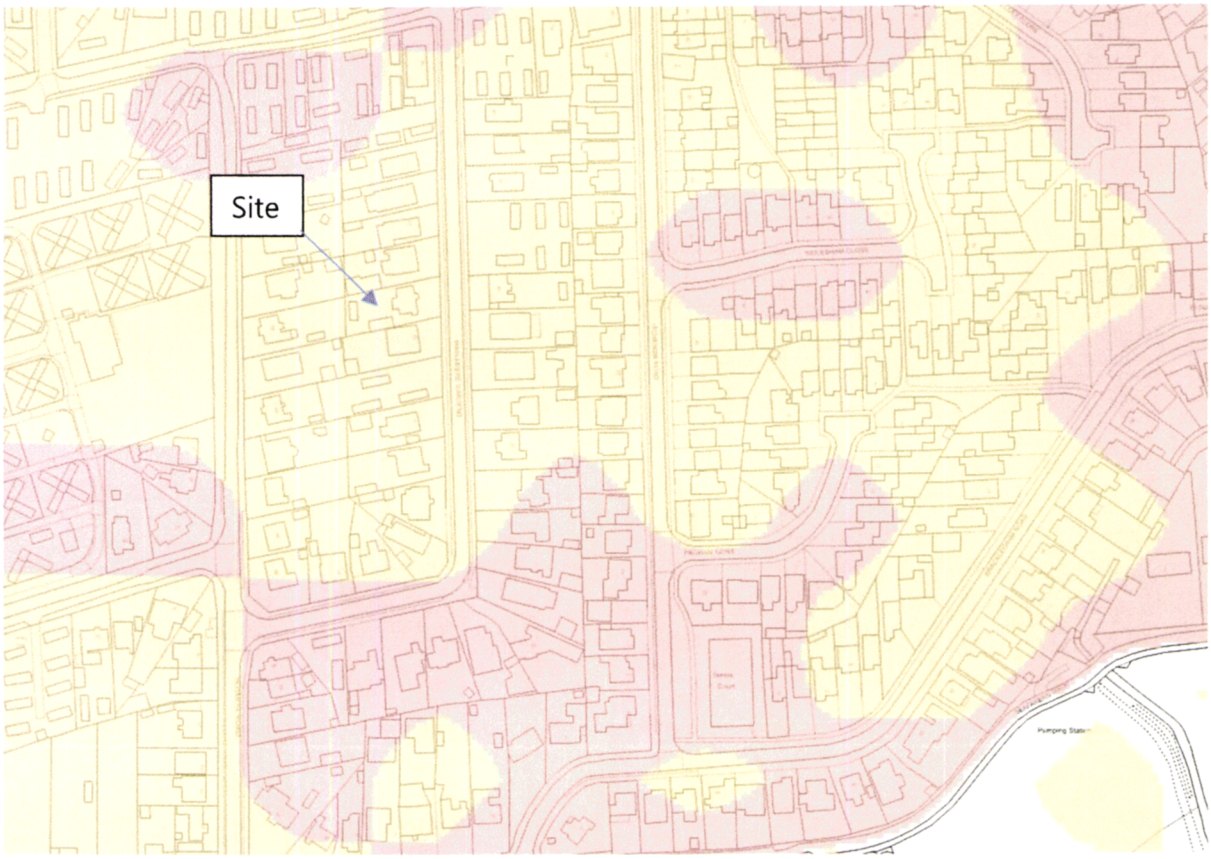
Partnership for Urban South Hampshire(PUSH) Strategic Flood Risk Assessment Map Extracts

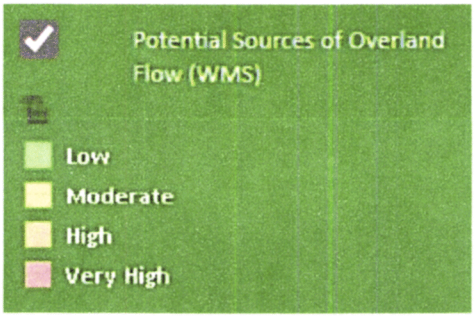
Undefended Flood Hazard Map (1% annual probability flood event)





Surface Water Flood Map





Southern Water Recorded Flood Incidents



Source of extracts: https://pcc.dynamicmaps.co.uk/MapThatPublic/Default.aspx#

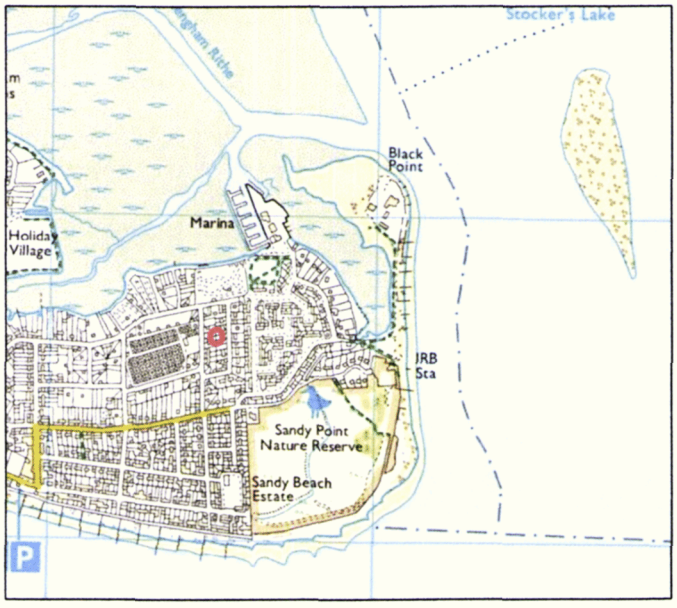
Appendix K

Flood Warning and Evacuation Plan

Flood Emergency Plan

17 Haslemere Gardens, Hayling Island

PO11 9SD



Prepared by .....

Michael Hartley

Review by .....

Tim Killingback

MH/TK/303499

February 2022

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2.0 Summary of flood risk 3

3.0 Flood Warnings 5

4.0 Safe refuge and evacuation 7

5.0 Role of the emergency services, local authority, Environment Agency and utility companies 9

6.0 Useful contacts 12

7.0 Monitoring and review of the Plan 13

8.0 Useful information 14

1.0 Introduction

1.1 Scott White and Hookins have been commissioned by Mr Geoff Tournoff to undertake a base template for a Flood Emergency Plan for the proposed residential development at land to the rear of 17 Haslemere Gardens, Hayling Island, PO11 9SD.

1.2 This Flood Emergency Plan provides a template to be completed and implemented by the owner or landlord responsible for the proposed dwelling.

1.3 This Flood Emergency Plan should be read in conjunction with the site Flood Risk Assessment undertaken by Scott White and Hookins.

1.4 The Flood Risk Assessment identified the site is located in Flood Zone 3 as it is at high risk of tidal flooding from the sea.

1.5 A Flood Emergency Plan is a written document that gives guidance on how to respond to a flood. This template lists the steps to be taken in case of a flood and checklists of procedures that can be quickly accessed by residents during a flood. Once the plan is completed, it should be updated regularly.

1.6 The proposed development comprises the removal of an existing static mobile home and demolition of outbuildings and erection of single storey dwelling with amenity area and parking at land to rear of 17 Haslemerre Gardens. See site plan appended to this report.

2.0 Summary of flood risk

2.1 Based on the Environment Agency flood map and the available SFRA, the whole site is located within Flood Zone 3a. Flood Zone 3a indicates this area is at risk from tidal flooding with an annual exceedance probability (AEP) of 0.5% (1 in 200 years).

2.2 Other sources of flooding have also been considered, including overland flow of surface water and groundwater. The proposed development will incorporate a new drainage system which will be designed in accordance with current design guidelines and thus mitigates the risk of surface water flooding on the site. The risk of groundwater flooding is considered to be low.

2.3 The primary risk of flooding is due to tidal flooding due to the site's proximity to The Solent. The primary factors leading to tidal flooding are the long term impact of climate change, and storm surge due to extreme weather and heavy rainfall.

2.4 Due to the nature of tidal flooding, the difference between high tide and low tide is approximately 6-7 hours, however the period over which the extreme high tide is likely to occur will only be a few hours.

2.5 With reference to the site plan, the finished floor levels of the new dwelling is to be set at 3.84m AOD which is above the current 0.1% annual probability modelled flood level. In order for the dwelling to be safe over its design lifetime (up to 2122), flood resistant/resilient measures are proposed above 3.84m AOD. The existing driveway to the side of the existing property and leading to the new dwelling will be raised to the current 0.1% annual probability modelled flood level, however safe access and egress will not be available for the anticipated lifetime of the development due to the impact of climate change on sea levels.

3.0 Flood Warnings

3.1 The site is eligible to sign up to the Environment Agency 24 hour service Floodline Warnings Direct. This is a free 24 hour service that sends automated flood warnings by telephone, SMS text, email, fax or pager. The residents should contact Floodline on 0345 988 1188 to register to receive the automated flood warnings. We would recommend a number of contact details are registered to ensure any flood warnings are received and actioned in a timely manner.

3.2 Further information is available from https://www.gov.uk/sign-up-for-flood-warnings or https://check-for-flooding.service.gov.uk/ where the current flood warning status is provided in more detail by clicking on the site location within the interactive maps. You can also use a quick-dial code for Floodline (0345 988 1188) at any time to check the current flood warning status.

3.3 The Environment Agency and Floodline will use the following alerts

- Flood alert

  What it means – Flooding is possible. Be prepared

  When it's used – Two hours to two days in advance of flooding

  What to do – Be prepared to act on your flood plan
  Prepare a flood kit of essential items
  Monitor local water levels and the flood forecast on www.environment-agency.gov.uk

- Flood warning

  What it means – Flooding is expected. Immediate action required

  When it's used – Half an hour to one day in advance of flooding

  What to do – Move possessions, valuables and pets to a safe place.
  If flood protection measures are available (air bricks and flood guards to the existing dwelling at the front of the site)
  Turn off gas, electricity and water supplies if safe to do so

Consider moving any vehicles which are parked at low level on site to outside the Flood Zone.

- Severe Flood warning

  What it means – Severe flooding. Danger to life

  When it's used – When flooding poses a significant risk to life

  What to do – Stay in safe place with means of escape

  Be ready should you need to evacuate

  Co-operate with the emergency services

  Call 999 if you are in immediate danger

- Warning no longer in force – This is triggered when a previously issued flood warning is no longer applicable. If evacuation has occurred residents should check with Havant Borough Council emergency authorities that it is safe to return to the building. If flooding has occurred contact your landlord/management company for advice (if applicable), take photos of any damage and contact your insurance company.

4.0 Safe refuge and evacuation

4.1 Safe refuge

- As discussed above, for the residents of the new dwelling, the ground floor level of the building is located at or above the current flood level but below the predicted long term flood level. The dwelling is considered to be safe up to 2075, and this can be extended with the incorporation of flood resistance measures such as flood guards. Therefore, given the expected duration of an extreme flood event, it is recommended residents stay within your property but this should be reviewed in the future.
- It is recommended that a flood kit or 'grab bag' of essential items is kept onsite to support a short-term refuge and/or evacuation.

4.2 Evacuation procedure

- Whilst the proposed dwelling is considered an area of safe refuge, if you need to evacuate the building, you should follow the route indicated in Figure 1 bellow, following the arrows to the non-blue shaded area which is anticipated will be above the flood level and therefore visible. The designated route will lead to Haven Road west of the site and into an area outside the Flood Zone (see Figure 1 below).

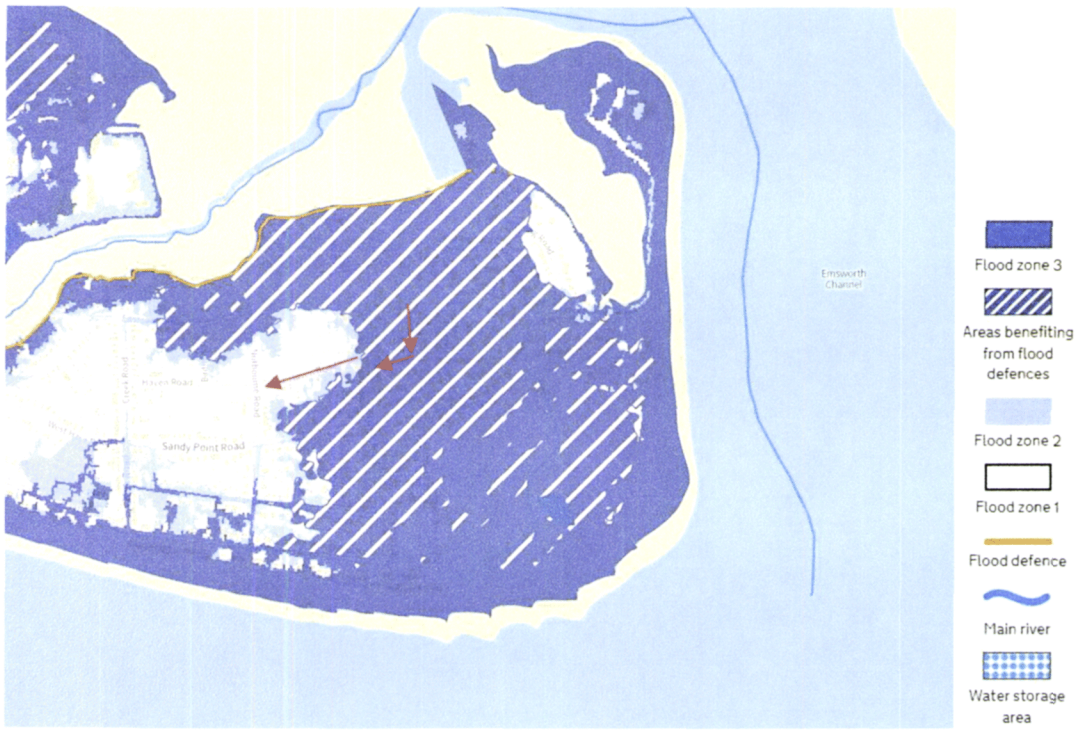


Figure 1: Proposed Flood Evacuation Route

4.3 Responding to flood warnings

- Resident should adhere to this Site Flood Plan however any guidance should be overridden by any advice given by competent authorised staff including the Emergency Services or Local Authority responders on the ground in the event of a serious flood event.

- The following table gives guidance on the location and procedure for cutting off existing services. Any additional services should be added to the list.

Service cut-off	**Location and procedure**
Electricity	
Gas	
Water	

5.0 Role of the emergency services, local authority, Environment Agency and utility companies

5.1 The response to a major flood event will involve a number of organisations working together at a local level to ensure people are kept safe, including the emergency services, local authority, the Environment Agency and utility companies. The Hampshire and Isle of Wight Local Resilience Forum (HIOW LRF) Multi Agency Flood Plan has been produced to provide relevant information and outline the response arrangements in place for a coordinated multi agency response.

5.2 The general roles of the main bodies in relation to a major flood event in Hayling Island are summarised below. It should be noted that this is a general list, and specific duties may vary between different bodies.

5.3 Hampshire Constabulary (Police):

- Overall coordination of the multi-agency response at a major flood event
- Coordinate any multi agency decision to evacuate in consultation with key partner agencies.
- Save life in cooperation with the other emergency services.

5.4 Hampshire Fire and Rescue Service:

- Assist with evacuation and coordinate search and rescue operations.
- Provide and/or obtain specialist advice and assistance where hazardous materials are involved.
- Obtain New Dimensions specialist equipment such as High Volume Pumps.
- Assist other relevant agencies, particularly the local authority, to minimise the effects of major flooding on the community.

5.5 Havant Borough Council as the Local Authority:

- Provide Rest Centre capability for flood risk affected communities and activate support staff and voluntary sector to support this.
- Provide emergency transport for people, equipment and materials, and if necessary evacuation.
- Provide advice and information to the public (websites, customer service centres, and social media) in accordance with the information provided in the HIOW LRF Multi Agency Flood Plan.
- Flood alleviation – for flood prevention, such as the placement of demountable flood barriers, clearing blocked culverts, for dealing with flooded roads and diversions and for other assistance to the public such as drying-out facilities.
- Emergency environmental health advice for action relating to environmental problems caused by flooding.
- Coordination of the voluntary response.

5.6 The Environment Agency:

- Issue flood alerts/ warnings and/or Operational Messages using their Flood Warning services to warn and inform the public and partners.
- Responsibility for maintenance and operation of Environment Agency owned flood defences. Checking defences and undertaking essential repairs and maintenance on Environment Agency owned flood defences and advise other owners on their maintenance responsibilities.
- Monitor water levels and flows, assessing the risk, clearing obstructions from known pinch points and advising the emergency services and the local authority.
- Along with partners, deploy temporary flood defences where impacts can be mitigated.
- Support the police and local authority by providing materials, equipment and manpower as far as resources and other duties permit, once own systems and flood defences are secure.

5.7 Utility Companies:

- Maintain the safety and integrity of the electricity/ gas/ water supply system.
- Liaise with partner agencies and obtain pumps to maintain the supply at key locations.
- Repair services and seek alternative means of supply during any disruption and restore supplies as soon as possible.
- Implement Business Continuity Plans.

6.0 Useful contacts

	Name / Company	Telephone number
Environment Agency Floodline		0345 988 1188
Landlord/management company		
Electricity supplier and meter number		
Gas supplier and meter number		
Water supplier and meter number		
Telephone provider		
Local authority emergency services		
Insurance company 24-hour number and policy number		
Insurance agent		
Non-emergency Police		
Non-emergency Fire Service		

7.0 Monitoring and review of the Plan

7.1 It is important that this Site Flood Plan is kept up-to-date and accurate. It is the responsibility of the Plan owner to maintain and update the Plan at least every three years, when new information becomes available or a change in circumstances that may affect it occurs.

7.2 It is the responsibility of the building owner (private ownership, landlord) to monitor, review and update the plan accordingly.

7.3 It is the responsibility of that person to ensure that all other individuals who use and reside at the dwellings are aware of the contents of the Plan and are made aware of any updates or changes.

7.4 It is the intention that this Plan is used as a basic template which can be amended or added to as necessary.

8.0 Useful information

Find out if your property is at risk of flooding – https://check-for-flooding.service.gov.uk/find-location

Sign up to receive flood warnings - https://www.gov.uk/sign-up-for-flood-warnings

Monitoring flood warnings and river levels - https://www.gov.uk/check-if-youre-at-risk-of-flooding

Make a personal flood plan https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan

Preparing your property for flooding - https://www.gov.uk/government/publications/prepare-yourproperty-for-flooding

What to do before, during and after a flood - https://www.gov.uk/government/publications/floodingwhat-to-do-before-during-and-after-a-flood

Using sandbags to reduce flooding - https://www.gov.uk/government/publications/sandbags-how-touse-them-to-prepare-for-a-flood

Advice on obtaining home insurance - https://www.gov.uk/prepare-for-a-flood/get-insurance

Improving your property's flood protection - https://www.gov.uk/prepare-for-a-flood/improve-yourpropertys-flood-protection

Blue Pages - directory of businesses providing flood resistance and resilience products - http://www.bluepages.org.uk/

Hampshire and Isle of Wight Multi-Agency Flood Response Plan –
https://www.iow.gov.uk/azservices/documents/1439-iwight3-IRF-Flood-Plan-v1.1-March-2011-Plan.pdf

Direct Government Preparing for Emergencies -
https://www.gov.uk/government/policies/reducingthe-threats-of-flooding-and-coastal-change/supporting-pages/planning-for-and-dealing-with-floodemergencies

UK Resilience - http://www.cabinetoffice.gov.uk/ukresilience.aspx

Appendices

Quick Reference Guide

The following provides a simple quick reference guide which can be printed and retained by all residents.

- Environment Agency 24 hour service Floodline Warnings Direct - contact Floodline on 0345 988 1188 to register to receive the automated flood warnings.

- Quick-dial code for Floodline at any time to check the current flood warning status. Call **0345 988 1188**, **press 1** and when requested enter the code **0122124** for Itchen Estuary area.

Flood warnings

- **Flood alert**

  What it means – Flooding is possible. Be prepared

  When it's used – Two hours to two days in advance of flooding

  What to do – Be prepared to act on your flood plan

  Prepare a flood kit of essential items

  Monitor local water levels and the flood forecast on

  www.environment-agency.gov.uk

- **Flood warning**

  What it means – Flooding is expected. Immediate action required

  When it's used – *Half an hour to one day in advance of flooding*

  What to do – Move possessions, valuables and pets to a safe place.

  If flood protection measures are available (air bricks and flood guards to the existing dwelling at the front of the site)

  Turn off gas, electricity and water supplies if safe to do so

  Consider moving any vehicles which are parked at low level on site to outside the Flood Zone.

- **Severe Flood warning**

  What it means – Severe flooding. Danger to life

When it's used – When flooding poses a significant risk to life

What to do – Stay in safe place with means of escape

Be ready should you need to evacuate

Co-operate with the emergency services

Call 999 if you are in immediate danger

- **Warning no longer in force** – *This is triggered when a previously issued flood* warning is no longer applicable. If evacuation has occurred residents should check with Southampton City Council or emergency authorities that it is safe to return to the building. If flooding has occurred contact your landlord/management company for advice (if applicable), take photos of any damage and contact your insurance company.

Find out if your property is at risk of flooding - http://www.environmentagency.gov.uk/homeandleisure/floods/31650.aspx

Sign up to receive flood warnings - https://www.gov.uk/sign-up-for-flood-warnings

Monitoring flood warnings and river levels - https://www.gov.uk/check-if-youre-at-risk-of-flooding

Make a personal flood plan - https://www.gov.uk/prepare-for-a-flood/make-a-flood-plan

Flood Map for Planning (Rivers and Sea) - Centred on Haslemere Gardens, PO11 9SD - Created 6 December 2021



Environment Agency

1: 10,000

0 Metres 250

N W E S

Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occuring each year.

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk


EXISTING CHALET HOUSE
No 19
OUTBUILDINGS.
BOUNDARY
RWG
7.500
BINS TO No 17 RECYCLABLES
PATH
EXISTING FENCE
5.000
2.200
VERGE
PAVEMENT
HASCOMBE GARDENS
PARKING FOR No 17
2.400
P3
1.200
PATH
ENT TO No 17
P2
PARKING FOR No 17
P1
SCALE
BEDRM 1
SH.RM
CLK.RM
W BEDROOM 2
HALL
MAIN ENT
ESMER
PRIVATE GARDEN TO No 17
NEW PLANTING (EVERGREEN VARIETY)
12.000
BEDRM
BEDRM
EXISTING SITTING RM
CHALET DWELLING
UP
CLK.RM
HALL
ENT PORCH
PATH
KITCHEN
DINING
KITCHEN
4.000
TERRACE
LIVING - DINING
RAMPED PATH
4.500
TERRACE
3.600
NEW BOUNDARY WALL
COURTYARD GARDEN TO NEW DWELLING
RWG
CAMBER PATH
WASTE BINS & RECYCLABLE
TURNING AREA: PERMEABLE PAVING ON SUDS BASE
PRIVATE DRIVEWAY (TO ROAD)
CHANNEL STRIP
VERGE
D.W. HARVESTING TANKS
NEW BOUNDARY EXCAVATIONS
4.800
3.000
4.800
2.
PARKING (FOR NEW DWELLING)
BOUNDARY
NORTH
No 15
EXISTING CHALET HOUSE
GROUND FLOOR PLANS AS PROPOSED:
DEVELOPMENT AT 17, HASCOMBE GARDENS HAYLING ISLAND HAMPSHIRE PO11 9SD for Mrs S. SHEA.
SCALE: 1:100 @ A3
DATE: JANUARY 2020
DRAWING NUMBER 421-2
G.R. TOURNOFF DIARCH. 55A, HEATH LANE FARNHAM SURREY GU9 0AE 01252 715787

Appendix L

SW Drainage Maintenance Schedule

This schedule sets out the inspection and maintenance requirements for long term management of the development's surface water drainage system. This work is to be undertaken by the Client.

All those responsible for maintenance should take appropriate health, safety and welfare precautions for all activities including lone working, if relevant, and risk assessments should always be undertaken. The site's infrastructure Health and Safety File should be consulted before carrying out any works either inside or outside of the development's boundary and information regarding the location of existing utilities passed on to operatives.

The requirements of the Health and Safety at Work Act 1974 and The Construction (Design and Management) Regulations 2015 should be adhered to and any residual risks identified in the Health and Safety File should be managed and information passed on to maintenance operatives through task specific risk assessments.

There are three types of maintenance activities associated with surface water drainage systems.

The SuDS Manual, CIRIA C753, defines these as:

- Regular Maintenance – *'basic tasks undertaken on a frequent and predictable schedule' including vegetation management, litter and debris removal, and inspections.'*
- Occasional Maintenance – *'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example.'*
- Remedial Maintenance – *'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.'*

SuDS Components Operation and Maintenance Activities

Operation and Maintenance activity	SuDS component (Components shown thus '~~Wetland~~' are not relevant to the project for which this schedule has been compiled.)												
	Pond	*Wetland*	**Detention basin**	**Infiltration basin**	**Soakaway**	**Infiltration Trench**	**Filter Drain**	**Modular Storage**	**Pervious Pavement**	**Swale/bioretention/trees**	**Filter Strip**	**Green Roofs**	**Proprietary Treatment Systems**
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■	■	□	■	■	■		□
Grass cutting	■	■	■	■	□	■	■	□	□	■	■		
Weed and invasive plant control	□	□	□	□		□	□		□		□	■	
Shrub management (including pruning)	□	□	□	□					□	□	□		
Shoreline vegetation management	■	■	□										
Aquatic vegetation management	■	■	□										
Occasional maintenance													
Sediment management[1]	■	■	■	■	■	■	■	■	■	■	■		■
Vegetation replacement	□	□	□	□						□	□	■	
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation /repair	□	□	□	□	□	□	□	□	□	□	□	□	
Infiltration surface reconditioning				□	□	□	□		□	□	□		

■ *Will be required* □ *May be required*

[1] Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

Piped Network / Chambers

Piped Network/Chambers Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required take remedial action	Monthly for three months, then six monthly
	Debris removal from catchment surface / gratings (where may cause risks to performance)	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catchpits.	Annually or as required
Remedial Maintenance	Repair / rehabilitation of gratings, inlets and outlets	As required
Monitoring	Inspect / check all gratings, trapped sumps, manholes and catchpits to ensure that they are in good condition and operating as designed	Annually and after large storm events
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of features or pipework is required.	As required

Permeable Pavements

Permeable Pavement Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over the whole surface). Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material if present. Any lost material should be replaced.	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers' recommendations – pay particular attention to areas where water runs from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weed or management using glyphosate applied directly to the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Maintenance	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structured performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 year or as required (if infiltration and

		filtration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and / or weed growth - If required, take remedial action.	Three-monthly, forty-eight hours after large rainfall events in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
The SuDS Manual Table 20.15: Operation and maintenance requirements for pervious pavements		

Appendix M

Local Drainage Planning Policy applicable to the development

National Guidance

2.1 The frequency and severity of river flooding is perceived to have increased in recent years and in an attempt to mitigate the flood risk the Government published Planning Policy Statement Note 25: Development and Flood Risk (PPS25) in December 2006. PPS25 detailed the importance of the effective management and reduction of flood risk in the land use planning process and attempted to address the issue of climate change. This has since been superseded by the National Planning Policy Framework and the supporting technical guidance.

2.2 Traditionally surface water runoff from developments has been conveyed by pipe systems to the nearest watercourse or sewer. This tends to increase the rate and volume of the run off often leading to flooding downstream of the new development. Latest policy promotes the use of sustainable urban drainage systems (SuDS) whereby the control of run off is to be as close to source as possible. This can be achieved by utilising techniques which mimic the natural drainage processes, the use of direct infiltration for example. The Environment Agency will, in general, seek to restrict the allowable discharge from a new development to that previously expected from the undeveloped land.

2.3 The requirements of the revised Building Regulations which came into force on1st April 2002 are that adequate provision should be made for dealing with rainwater from the roofs of buildings and certain paved areas providing access to the buildings. Run off from such drainage systems are to be discharged to one of the following systems listed in order of priority:-

- A soakaway or other infiltration system
- A watercourse
- A sewer or drain

2.4 The revised Building Regulations were drafted to reinforce the requirements for SuDS wherever possible.

2.5 The Requirements of a Flood Risk Assessment:

2.5.1 A Flood Risk Assessment is required in order to ascertain whether a development will exacerbate the risk of flooding elsewhere in the catchment or is at risk of flooding itself.

2.5.2 A site specific FRA is required for: -

- Proposals of 1 Hectare or greater situated in Flood Zone 1

- New development (including minor development and change of use) located in areas of Flood Zone 1 that have critical drainage problems
- New development (including minor development and change of use) located in areas of Flood Zones 2 & 3.

Local Policies

2.6 The Borough of Havant Core Strategy (BHCS) dated March 2011 which forms part of the Local Plan outlines the different requirements of new developments. The requirements of the BHCS relating to flood risk (Policy CS15 Flood and Coastal Erosion Risk) states:

Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

1. It meets the sequential and exception test (where required) in relation to PPS25.
2. The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.
3. A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
4. The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site.
5. Appropriate flood warning and evacuation plans are in place.
6. New site drainage systems are designed taking account of events which exceed the normal design standard.

All development will be required to ensure that there is no net increase in surface water run off. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDs are provided arrangements must be put in place for their whole life management and maintenance.

The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.