

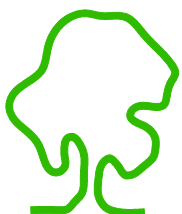
DAVID HILL

**PASCOTTS FARM, SNOWDROP LANE, LINDFIELD,
WEST SUSSEX, RH16 2EQ**



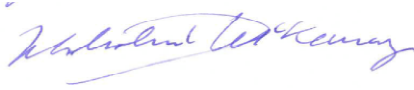
Flood Risk Assessment and Drainage Strategy

June 2025
(Revised June 2026)



EAS ltd
Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	Data
Report Reference	798/GB/PascottsFarm/FRA&DS
Date	June 2025
Client	Mr David Hill
Report type	Drainage Strategy
Purpose	Planning
Revisions	June 2026
Prepared by	Daniel Milford BSc (Hons)  Signed
Approved by	Eur Ing Malcolm McKemey BSc (Hons), CEng, CEnv, MICE, MCIWEM, MIEEnvSc  Signed

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Flood Risk Assessment and Drainage Strategy – Surface Water and Foul Sewage

June 2025
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WEST SUSSEX RH16 2QE

Flood Risk Assessment and Drainage Strategy – Surface Water and Foul Sewage

June 2025
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1. BACKGROUND, EXISTING SITE & PROPOSED DEVELOPMENT

- 1.1. The site, as existing, comprises of a small field or paddock, surrounded by hedgerow and young and semi-mature oaks and other deciduous trees in the west boundary of site. A pond is found in the southwest corner of site and an assemblage of oak trees is in the southwest corner.
- 1.2. The site lies on the northwest side of Snowdrop Lane in the village of Lindfield. The site area is approximately 0.33 ha. The Ordnance Survey (OS) map reference for the site is TQ 3530 2375. The site elevation is approximately 65 m AOD. See Appendix A, Figure 1 for the site location and Figure 2 for the existing site layout.
- 1.3. It is proposed to develop the site for two detached houses with double garages, gardens and driveways. See Appendix A, Figure 3 for the proposed development layout.
- 1.4. This Flood Risk Assessment and Drainage Strategy is prepared generally in accordance with the Revised National Planning Policy Framework (NPPF) and its accompanying Update Planning Practice Guidance (PPG), published in July 2024.

2. GEOLOGY & HYDROGEOLOGICAL CONSIDERATIONS

- 2.1. According to the British Geological Survey, the site lies on Upper Tunbridge Wells Sand (sandstone and siltstone) formed during the Cretaceous period. Sandstone and siltstone, interbedded over sedimentary bedrock formed during the Cretaceous period. The DEFRA Magic site describes the soil type as *“Freely draining slightly acid sandy soils”*.
- 2.2. The Upper Tunbridge Wells Sand is classified as a Secondary A aquifer. The site lies within an area of High groundwater vulnerability. The site does not lie within a groundwater source protection zone.

- 2.3. The site lies approximately 320 m northwest of a main watercourse, the Scrase Stream, a tributary of the River Ouse, although Lindfield stands on high ground above the reaches of the river. There are flood warnings in place for breaches in the River Ouse. However, the site does not lie within an area that is likely to be impacted by any breach of the river bank.

3. FLOOD RISK ASSESSMENT

3.1. Flood Risk Outline

- 3.1.1. The EA Flood Map for Planning showed the site to lie within Flood Zone 1 (less than 0.1% chance of flooding each year from fluvial sources, where defences are not considered). The EA surface water flood risk map shows the site to be at very low risk of surface water flooding. Flooding from reservoirs or groundwater is considered unlikely at this location. See Appendix B.

- 3.1.2. An assessment of alternative sources of flooding potentially affecting the site has also been made from a review of the Level 1 Strategic Flood Risk Assessment (SFRA dated June 2015) prepared for Mid Sussex District Council, West Sussex Local Flood Risk Management Strategy: 2025 - 2030 Consultation Draft (LFRMS dated May 2024) and EA online mapping. The EA Product 4 data for the site was requested in April 2025, however no flood risk data for the location was available for the following reasons:

- No detailed flood modelling data for the site, as it is not within 150 metres of an area at risk of flooding from rivers or the sea.
- No records of historical flood events from rivers or the sea affecting the area local to the site.

- 3.1.3. The SFRA addresses alternative sources of flooding including fluvial flooding, surface water flooding, groundwater flooding, flooding from sewers and flooding from reservoirs.

- 3.1.4. The SFRA states: *“Analysis undertaken for the West Sussex Local Flood Risk Management Strategy identifies ‘wet spots’ where a limited number of properties are considered to be at risk. Mid Sussex contains six significant clusters of properties that are at risk of flooding. These are in Burgess Hill, East Grinstead, Haywards Heath/Lindfield and Sayers Common (mostly surface water flood risk)”*. The closest of these ‘wet spots’ is at the Scrase Bridge where the B2028 road crosses the Scrase Stream some 1.5 km from the site.

3.2. History

- 3.2.1. The history of flooding at and around the site is taken from Environment Agency data and the SFRA.

- 3.2.2. Parts of Lindfield have experienced flooding from the neighbouring watercourse (Scrase Stream) approximately 320m southeast of the site,

however, no historic flood events affecting the site or its immediate surroundings have been found.

3.3. **Defences**

- 3.3.1. The site is not directly protected by any fluvial defence works. There are defences around the River Ouse to the northwest of the site.

3.4. **Coastal Flooding**

- 3.4.1. The site is not at risk from coastal flooding, being well inland and at a higher elevation.

3.5. **Surface Water Flooding**

- 3.5.1. The EA's online surface water flood risk map shows that the site is in an area at very low risk of surface water flooding in the 1 in 30-year scenario and will remain at very low risk in the 1 in 100 and 1 in 1000-year scenarios.

3.6. **Sewer Flooding**

- 3.6.1. There does not appear to be any record of sewer flooding directly affecting the site.

3.7. **Planning Status with Respect to Flooding**

- 3.7.1. The site is shown on the current Environment Agency (EA) flood risk mapping as being within Flood Zone 1 (at less than 0.1% risk of flooding in any year).
- 3.7.2. Residential dwellings are classified as 'More Vulnerable' under Table 2 of the NPPF PPG. According to Table 3 of the PPG, 'More Vulnerable' development is appropriate within Flood Zone 1. It is expected that the site would remain in Flood Zone 1 for the duration of its lifespan.
- 3.7.3. The site lies within Flood Zone 1, as such, the Sequential Test is satisfied and there is no need to apply the Exception Test.

3.8. **Risk to Property**

- 3.8.1. The site is in Flood Zone 1 and at very low risk of surface water flooding. The site is expected to remain in Flood Zone 1 for the remainder of the development's lifespan. So long as the finished ground floor level is a suitable margin above the design flood level, no flood related risk to property is envisaged.
- 3.8.2. The EA recommends a finished ground floor level must exceed by 600 mm the highest of the following values:
- Average ground level of the site
 - Adjacent road level to the building(s)

- Estimated river or sea flood level for the site

- 3.8.3. The exceedance may be reduced to 300 mm when a high level of certainty is achieved regarding flood risk, which is the case in this instance.
- 3.8.4. As there is a very low risk of river or coastal flooding at the site, and the topography map suggests the direction of flow for surface water on the road will continue to follow the road rather than across the site, only average ground level will be considered.
- 3.8.5. As the ground level of the site varies quite substantially between the two units, and the houses have been designed to follow the topography of the land, each plot will be considered separately.
- 3.8.6. The site average ground level of Plot A is +20.97 m OD giving a recommended finished ground floor level of +21.27 m OD.
- 3.8.7. The site average ground level of Plot B is +20.31 m OD giving a recommended finished ground floor level of +20.61 m OD.

3.9. **Risk to Occupiers of the Proposed Development**

- 3.9.1. As the site lies in Flood Zone 1, at very low risk of surface water flooding, and groundwater and reservoir flooding is considered unlikely in this area, there should be no flood related risk to the proposed occupants of the redevelopment whilst they are on site.
- 3.9.2. The site elevations drop to the east and west and any water present on the surface of the ground will drain in either direction and will not pool onsite.
- 3.9.3. Site access and egress can be achieved being in flood zone 1.

3.10. **Impact on Flood Risk Elsewhere**

- 3.10.1. The site is presently entirely undeveloped grassland. The proposed redevelopment will leave the site partly under hard cover, comprising the areas of the roofs of the dwellings, garages and parking areas. As a result, the impermeable area of the site will increase and may increase the flood risk further downstream.

- 3.10.2. The runoff from the site and the flood risk downstream of the site can be reduced by including sustainable drainage (SuDS) measures in the proposed redevelopment, such as permeable paving in the areas of hardstanding, water butts on the drainpipe down pipes (to be used for garden irrigation) and rain gardens.

4. EXISTING SITE DRAINAGE

- 4.1. The site was visited on Monday 12 May 2025 and Friday 30 May 2025. Photographs of the site are provided in Appendix E. No formal surface water drainage was apparent at the site, currently draining as greenfield down the hill to a valley area northwest of the site. The water flows from here across the adjacent site to later join the Scrase Stream.
- 4.2. Drainage ditches once existed down the hill along the tree lines of the adjacent field, however these are heavily overgrown and poorly defined. The pond to the south of the site discharges to the public drain on the opposite side of Snowdrop Lane via drainage beneath the road.
- 4.3. According to the Southern Water manhole schematic, the closest foul water accommodating manhole lies approximately 100 m southwest of the site in the garden of 9 Lyoth Lane. Foul sewage from the house at Pascott's Farm building is discharged to a sewage treatment plant housed at the top of the northeast adjacent field.
- 4.4. There is a general requirement that new drainage systems should be sustainable (SuDS) and that flow leaving the site should not exceed the Greenfield flow rate, including both surface water and sewage effluent. The Greenfield runoff rate for the site has been calculated using the UK SuDS tools, the results are shown in See Appendix C and summarised in Table 4.1 below:

TABLE 4.1
GREENFIELD RUNOFF RATES

Return period	Flow rates (l/s)
QBar	1.9
1 in 1 year	1.6
1 in 2 year	1.7
1 in 10 year	3.1
1 in 30 year	4.4
1 in 100 year	6.1
1 in 200 year	7.1

- 4.5. In any case, according to the DEFRA non-statutory technical standards for sustainable drainage systems, the maximum discharge permitted to leave the site from the drained area post development should not exceed the QBar greenfield flow rate (1.9 l/s), or as near as practicable. See Appendix C for the HR Greenfield Flow Rate tool data.

- 4.6. The foul sewage should also be allowed for in the permitted discharge flow rate. The peak foul sewage design flow has been calculated for the proposed site as 0.1 l/s (see Section 8 below), therefore the surface water discharge should not exceed 1.8 l/s.

5. **SOIL PERMEABILITY**

- 5.1. The site currently largely drains as Greenfield, with some surface infiltration and surface runoff to the existing drainage ditches.
- 5.2. The underlying soil (Upper Tunbridge Wells Sand) typically has poor permeability, although some more permeable bands of sandstone or limestone may be found within it. In this case, the presence of self-maintaining ponds nearby suggests confirmation of the low permeability of soil.
- 5.3. Poor permeability was confirmed during percolation testing carried out on 12 May 2025 as no significant infiltration was observed.
- 5.4. As drainage to a soakaway will not be viable, the alternative option will be drainage to attenuation storage. Excess surface water is stored on site, either in a pond, swale or underground attenuation storage unit. The surface water is allowed to discharge at a maximum of the greenfield flow rate via a flow-control vortex valve or orifice plate into a nearby watercourse.

6. **PROPOSED SURFACE WATER DRAINAGE OPTIONS**

- 6.1. The proposed development is expected to result in an increase in the impermeable area on site. Excluding the buildings, most of the remainder of the site will consist of permeable surfacing (gravel, etc.). Rainwater harvesting through roof downpipes will be employed to store water for irrigation and other non-potable uses. This will reduce the surface water runoff and make the site more sustainable.
- 6.2. The underlying Upper Tunbridge Wells Sand is unsuitable for soakaway drainage due to the lack of permeability and surface water drainage to soakaway has not been considered further for this development.
- 6.3. The alternative to drainage to soakaway will be drainage to attenuation storage, where surface water flow exceeding 1.8 l/s is stored in an attenuation pond or underground storage unit with a flow control chamber and released through a vortex valve at a rate limited to greenfield flow (as close as practicable) into the neighbouring watercourse/ditch. It has been concluded that attenuation storage is the most practicable solution for the disposal of surface water at this site.

- 6.4. The required attenuation storage volume has been modelled using the MasterDrain model (see Appendix D). The total storage volume required for the site, for the 1 in 30 year plus 40% climate change scenario and 10% urban creep, with volumetric runoff coefficient (cv) of 1.0, has been calculated as 27 m³. The volume may be provided in a swale, the freeboard of a pond or in underground storage crates. Due to the levels of the site, it is considered most practicable that an underground geocellular/modular system is utilised.

7. SURFACE WATER DRAINAGE DESIGN

7.1. Design Philosophy

- 7.1.1. The drainage strategy is for surface water to be drained into attenuation storage, comprising a geocellular/modular system, before being discharged to the existing drainage ditch located at the northwest corner of the site, with discharge limited to the QBar flow rate for the site by a vortex valve (in this case 1.8 l/s). This ditch flows north down the hill, until it meets an eastern flowing tributary of the River Ouse.

7.2. Design Storm

- 7.2.1. The surface water drainage system has been designed for the 30-year return period event plus a 40% allowance for climate change and 10% urban creep, and tested for surcharge for the 1 in 100-year return period event (1% Annual Exceedance Probability) plus 45% allowance for climate change. See Appendix A, Figure 4 for the suggested drainage design and Appendix D for pipe and chamber details.

7.3. Drainage Design Model

- 7.3.1. The attenuation storage has been designed to accommodate the 1 in 100-year return period storm event plus a 45% allowance for climate change using the MasterDrain network model.
- 7.3.2. An appropriate attenuation storage size has been calculated as 10 m long, 4 m wide and 0.8 m deep. This could be accommodated behind the dwelling in plot A. See Figure 4 in Appendix A.

7.4. Hydrogeological Data

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

7.5. Design Layout

- 7.5.1. The layout of the proposed redevelopment is shown in Figure 3. The proposed drainage arrangement is shown in Figure 4.
- 7.5.2. The results of the MasterDrain network drainage model are given in Appendix D and summarised in Table 7.1.

TABLE 7.1
SURFACE WATER DRAINAGE

Chamber No.	Chamber diameter (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe diameter in (mm)	Pipe Diameter out (mm)
SW1	900	20.40	19.90	-	150
SW2	450	20.80	19.61	150	150
SW3	450	20.50	20.00	-	100
SW4	450	20.40	19.45	150	225
SW5	450	20.70	20.20	-	100
STORAGE	-	20.20	19.17	225, 100	100
SW6	450	20.00	19.09	100	100

7.6. Other Sustainable Urban Drainage System (SUDS) Options

- 7.6.1. The development will have permeable crushed stone driveways. This will permit surface water to infiltrate into the underlying structure, delay discharge and reduce peak flows following a rainfall event. It is recommended that the permeable surface be underlain by a permeable geotextile membrane connected to the surface water drainage system.
- 7.6.2. A rain garden is to be installed to the rear of the properties as a further SuDS measure to aid in the surface water runoff. This is done by collecting rainwater and delaying its discharge into the system and reducing overall flow rate as well as hosting plants to aid in increasing rain runoff reabsorption. While these have been mapped on Figure 4, they are not definitive in shape or dimensions and may be adjusted to avoid root protection areas.
- 7.6.3. Rainwater harvesting could also be practiced. Rainwater could be used for irrigation purposes within the garden, via water butts connected to roof downpipes.
- 7.6.4. It may be possible to incorporate a green roof into the proposed design. Green roofs reduce the volume and rate of runoff and can be low maintenance, generally requiring bi-annual maintenance visits.

7.7. Extreme Event

- 7.7.1. If an extreme event overwhelmed the surface water drainage system at the site and/or if the drainage system were to fail, ground levels would indicate that surface water would follow the existing course and flow north across the surface of the ground into the drainage ditches located on the northern boundary of the adjacent field as per the present situation. The proposed rain gardens along the northern boundary of the site would reduce the overall exceedance flow rate.

8. PROPOSED FOUL DRAINAGE

- 8.1. The proposed development will require foul sewerage. There is no existing foul sewerage connection at the site as it is laid entirely to pasture.
- 8.2. As there do not appear to be any public foul sewers within practicable reach of the site, discharging to public foul or combined sewer is not an option. The site presently has a package sewage treatment plant located in the northeast field, discharging treated effluent into the watercourse. This is currently used by the existing farmhouse building but, subject to investigation of the current capacity and effluent disposal arrangement, could also be used by the proposed new development. If the present plant is too small for the existing and proposed residences, an upgraded plant will be installed.
- 8.3. The proposed development will comprise of two dwellings. According to the WRc publication "Sewers for Adoption" (8th Edition), the design (peak) flow from a proposed residential development should be based on water use of 4000 l/dwelling/day (0.05 l/s per dwelling). This gives the overall (peak) foul sewage design flow for the site as 0.1 l/s.
- 8.4. The foul sewage design flow from the proposed redevelopment has been modelled using the MasterDrain (foul) network model and the model output is given in Appendix D and summarised in Table 8.1.

TABLE 8.1
FOUL SEWERAGE

Chamber No.	Chamber diameter (mm)	Cover level (mAOD)	Invert level (mAOD)	Pipe diameter in (mm)	Pipe diameter out (mm)
FW1	450	20.40	19.90	Head	100
FW2	450	20.50	19.68	100	100
STP	-	17.00	16.50	100	-

9. OPERATION & MAINTENANCE OF THE SYSTEM

- 9.1. The drainage system will generally require minimal operational input once construction has been completed. However, it will require some regular maintenance.
- 9.2. Items requiring maintenance will include:
- The flow control chamber, particularly the flow control device. This will require regular removal of any debris likely to obstruct the vortex valve. Maintenance should be carried out at the time of year after most leaf fall has occurred.
 - The chambers, gullies, gutters, attenuation storage system and channels will require regular removal of any silt or other debris. Maintenance should be carried out at the time of year after most leaf fall has occurred.

- The sewage treatment plant will require regular maintenance including monthly visual inspections for damage, wear and corrosion as well as overall security; cleaning every 6 – 12 months, based on usage; removal of debris as and when necessary; and inspection of pumps and control systems every three months.
- The attenuation storage crates are to be monitored and maintained to ensure that they are in good condition and operating as designed to prevent the loss of maximum volume.

10. SUMMARY

- 10.1. The site lies within Flood Zone 1, at very low risk of flooding from surface water, and groundwater and reservoir flooding at the site is considered unlikely. No other flood risks likely to affect the site have been identified.
- 10.2. The underlying geology, Upper Tunbridge Wells Sand exhibits very poor permeability and results of percolation testing support this. As such, it is considered that the site is unsuitable for drainage to soakaway (the preferred method of dealing with surface water in the sustainable drainage - SuDS - hierarchy). The alternative SuDS preferred method of draining surface water is drainage to attenuation storage with outflow limited to 1 in 1-year greenfield flow rate (1.8 l/s) discharged to an existing watercourse or drainage ditch.
- 10.3. The attenuation storage may be provided in the form of an underground geocellular/modular behind the proposed dwelling on plot A. This would then discharge into the ditch in the northwest corner of the site. This ditch has been shown to flow northward down the hill and eventually into a tributary of the River Ouse. An appropriate attenuation storage size has been calculated as 10 m long, 4 m wide and 0.8 m deep with a vortex valve flow control device discharging at a maximum of 1.8 l/s to the aforementioned drainage ditch. See suggested drainage design in Figure 4. A rain garden is to be constructed at the rear of the site as a further SuDS measure.
- 10.4. Rainwater harvesting from downpipes to collect water for irrigation and other non-potable uses would further improve the sustainability of the site. Additional sustainable drainage (SuDS) measures would be permeable paving for the external parking, driveway and access areas, and rainwater butts on the drainpipe downpipes.
- 10.5. An extreme event overtopping the system would likely follow the existing flow pattern, draining across the surface of the ground to the drainage ditch located to the north of the site. There should be no significant flood risk to the proposed dwellings or occupants, and safe access should be available onto Snowdrop Lane under all flood scenarios.

- 10.6. The proposed development will require foul sewerage. The site presently has a package sewage treatment plant located in the northeast field, discharging treated effluent into a nearby watercourse. This is currently used by the existing farmhouse building but, subject to investigation of the current capacity and effluent disposal arrangement, could also be used by the proposed new development. If the present plant is too small for the existing and proposed residences, an upgraded plant will be installed.
- 10.7. The surface water flow control device and the sewage treatment plant will require regular maintenance, and all chambers will require the occasional removal of silt and debris. The attenuation storage crates are to be maintained to prevent loss of maximum volume.

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APPENDIX A:

- Figure 1: Site Location
- Figure 2: Site as Existing
- Figure 3: Proposed Development
- Figure 4: Suggested Drainage Arrangement
- Figure 5: Drainage Long Section
- Figure 6: Suggested Outfall Details



SITE LOCATION PLAN - AS EXISTING
SCALE @ 1:1250 ON AN A1 SHEET



Pascotts Farm

Scale as shown

Snowdrop Lane, Lindfield, West Sussex, RH16 2QE

Figure 1: Site Location

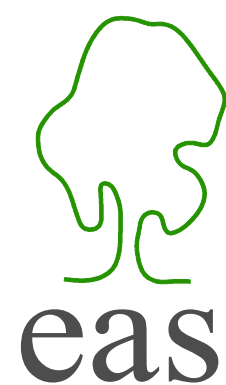
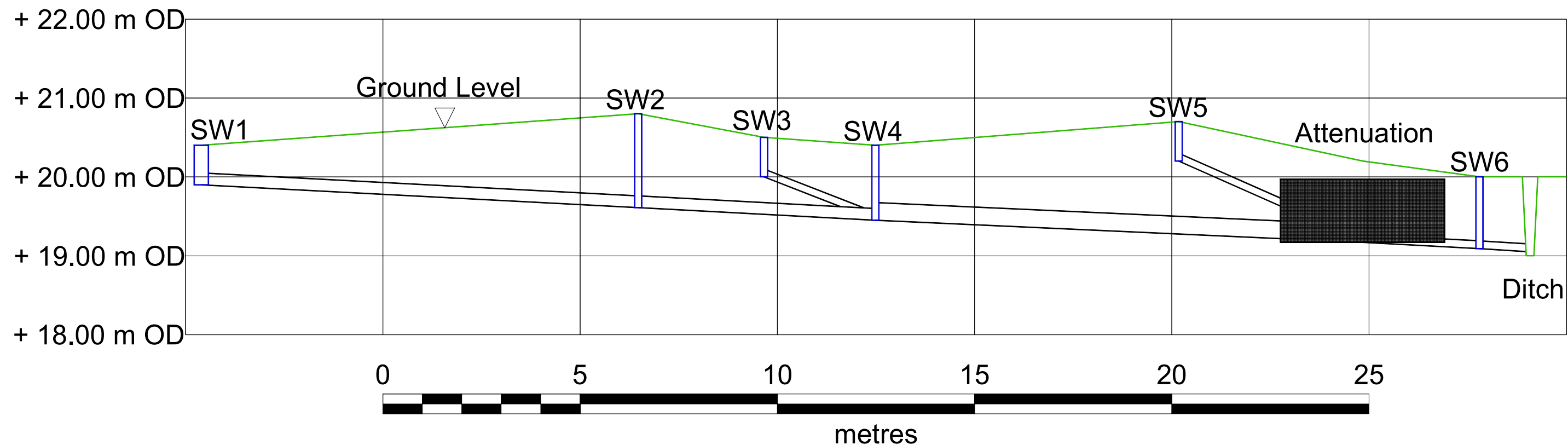
April 2025



Scale as shown

Figure 2: Existing Site Topographic Layout

June 2025



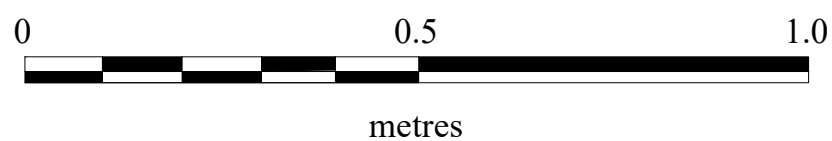
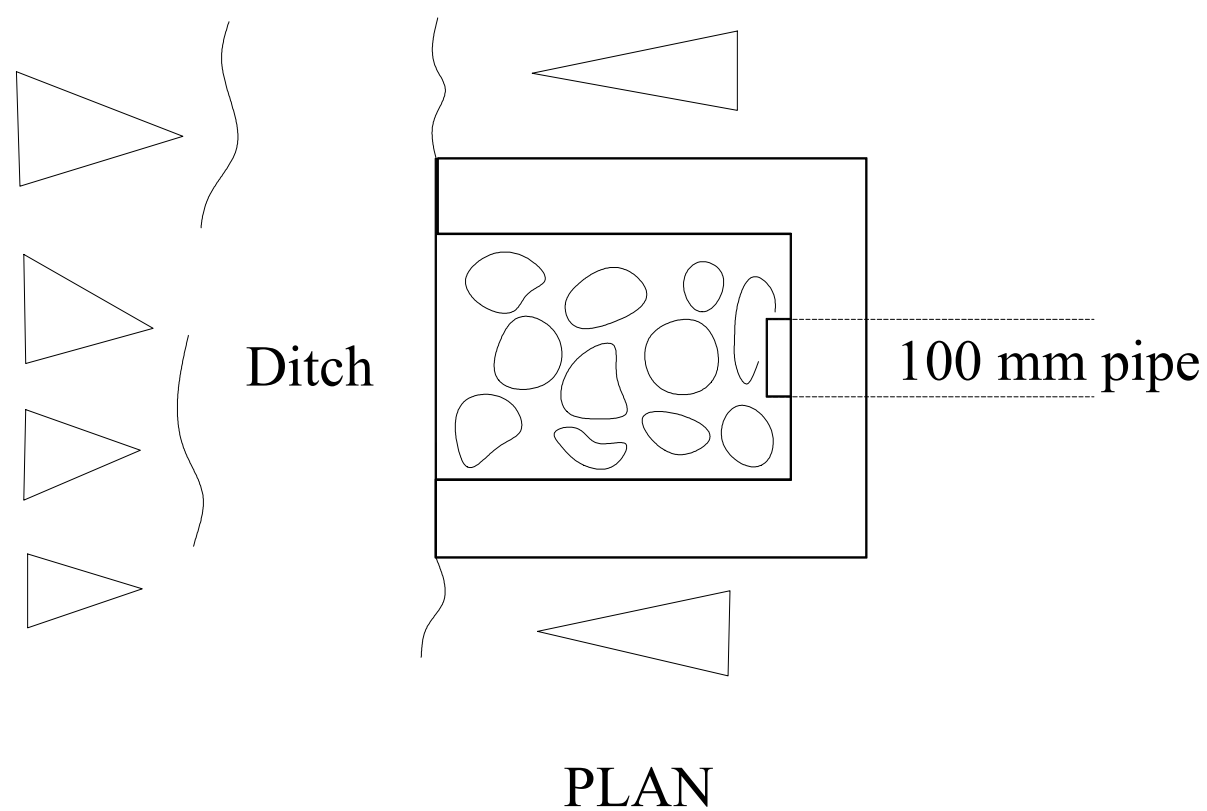
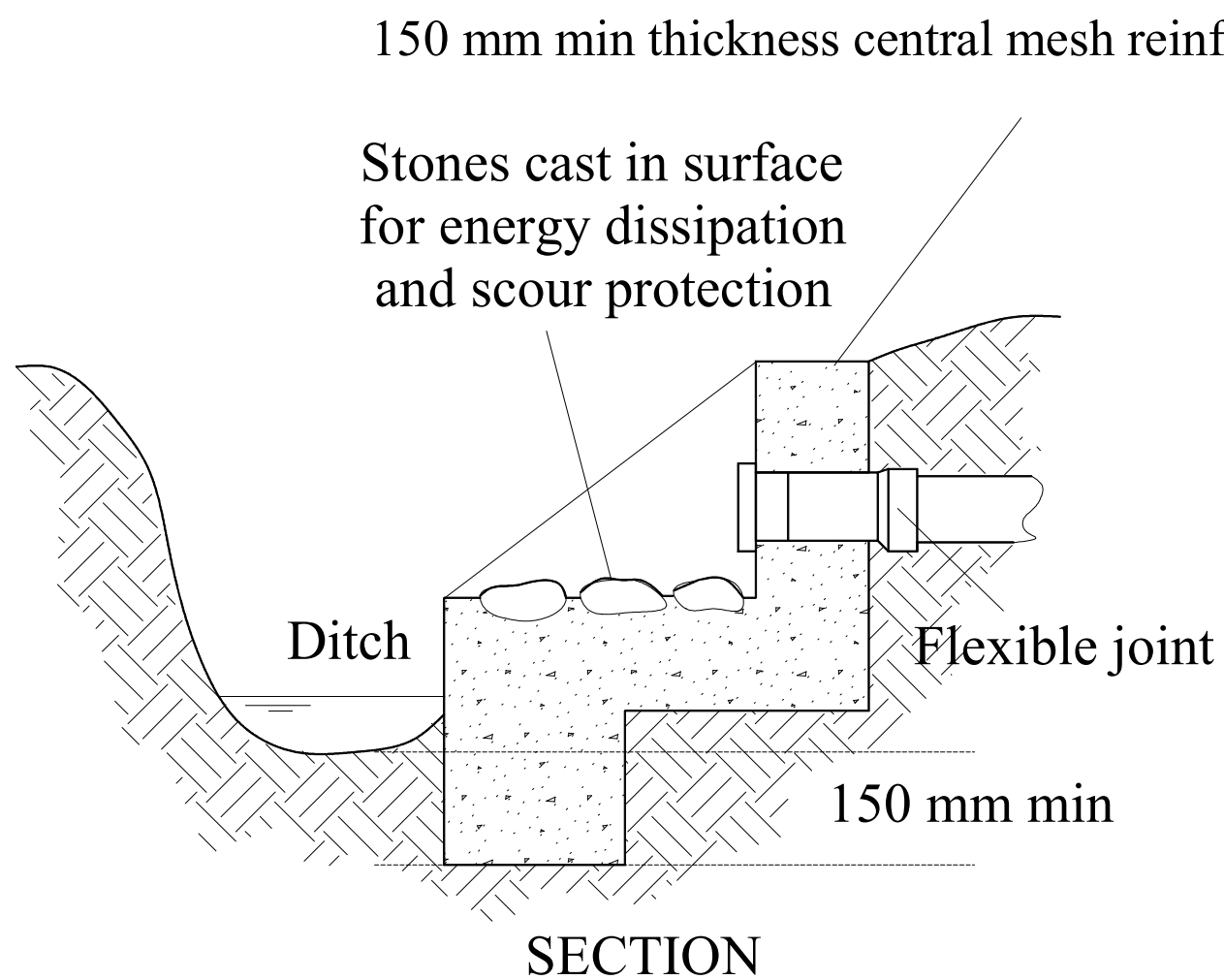
DAVID HILL

Scale as shown

PASCOTTS FARM, SNOWDROP LANE, LINDFIELD,
WEST SUSSEX RH16 2QE

Figure 5: Drainage Long Section

June 2026



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Scale as shown

PASCOTTS FARM, SNOWDROP LANE, LINDFIELD,
WEST SUSSEX RH16 2QE

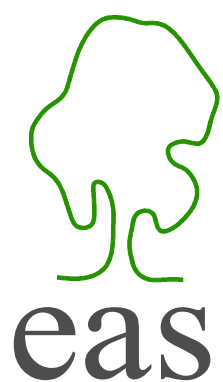


Figure 6: Suggested Outfall Details

June 2026

APPENDIX B:
ENVIRONMENT AGENCY FLOOD RISK SUMMARY

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
535305/123793

Created
28 May 2025 16:05

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

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

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

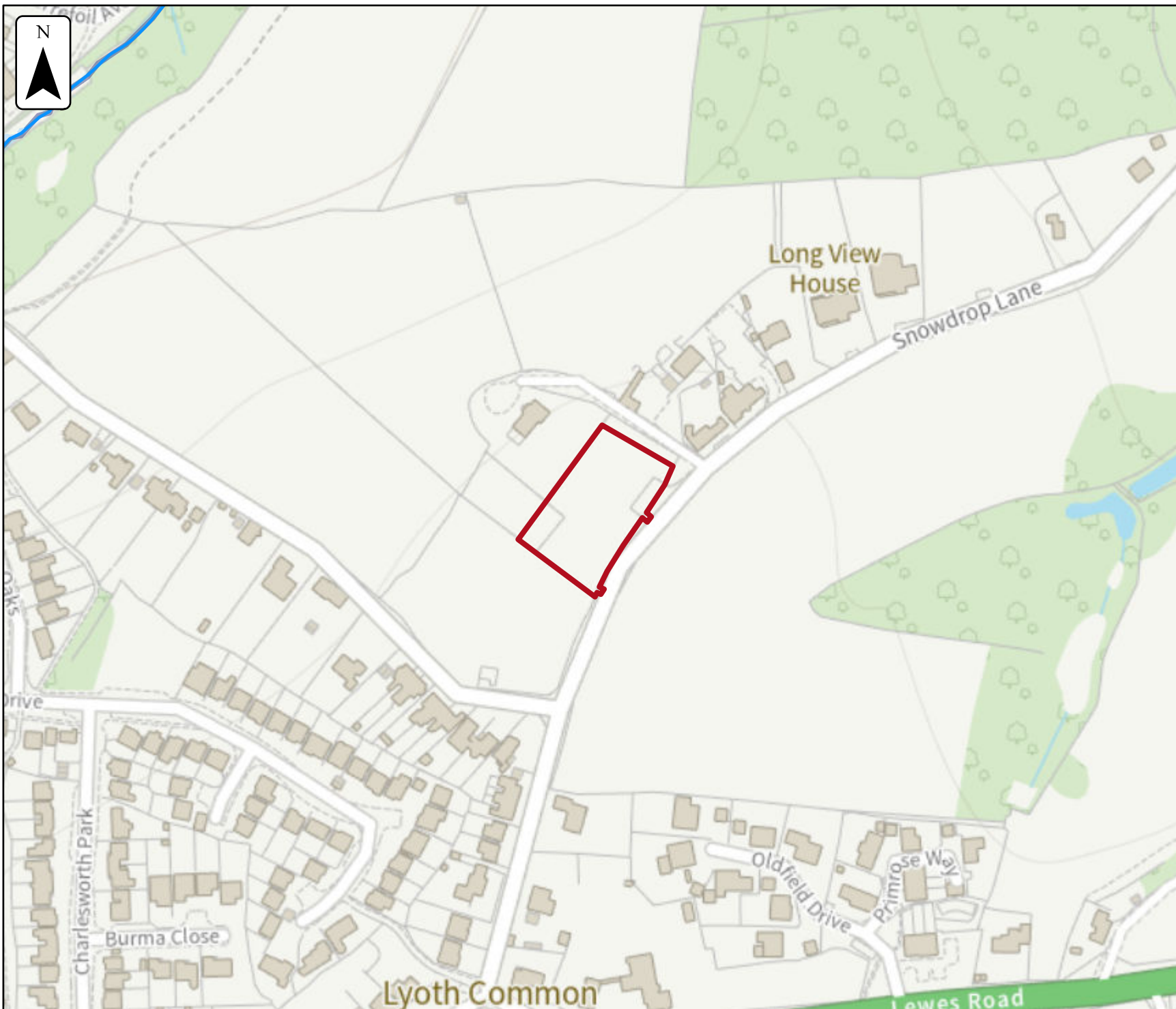
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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 2025 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Unspecified

Location (easting/northing)
535305/123793

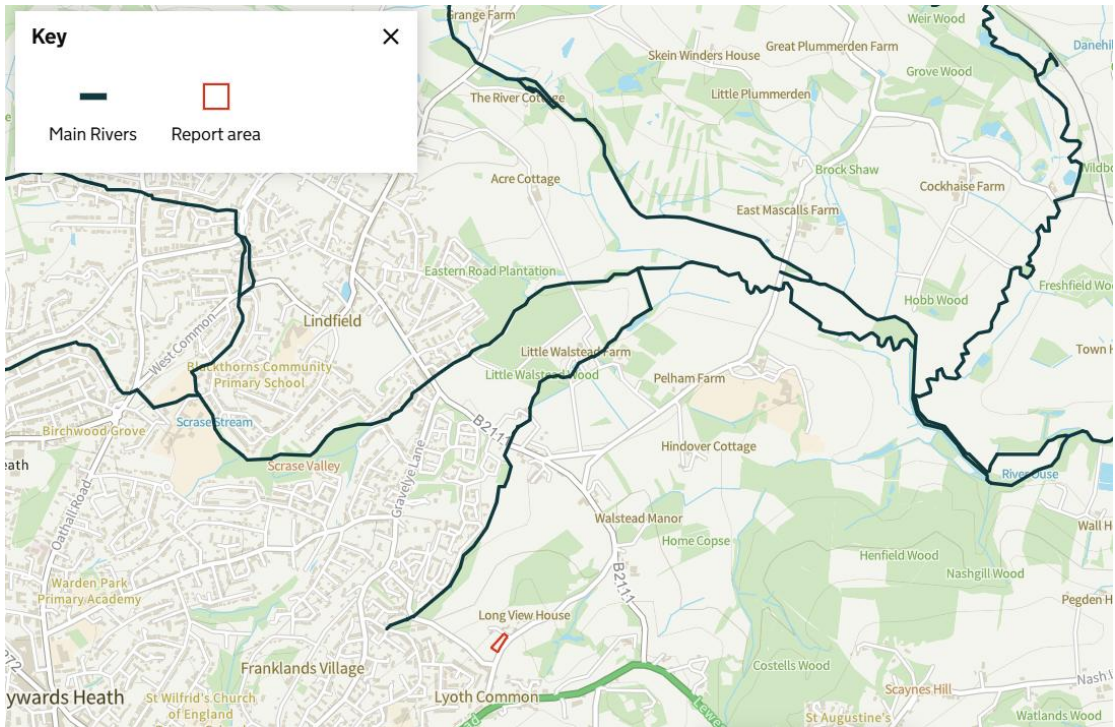
Scale
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Created
28 May 2025 16:05

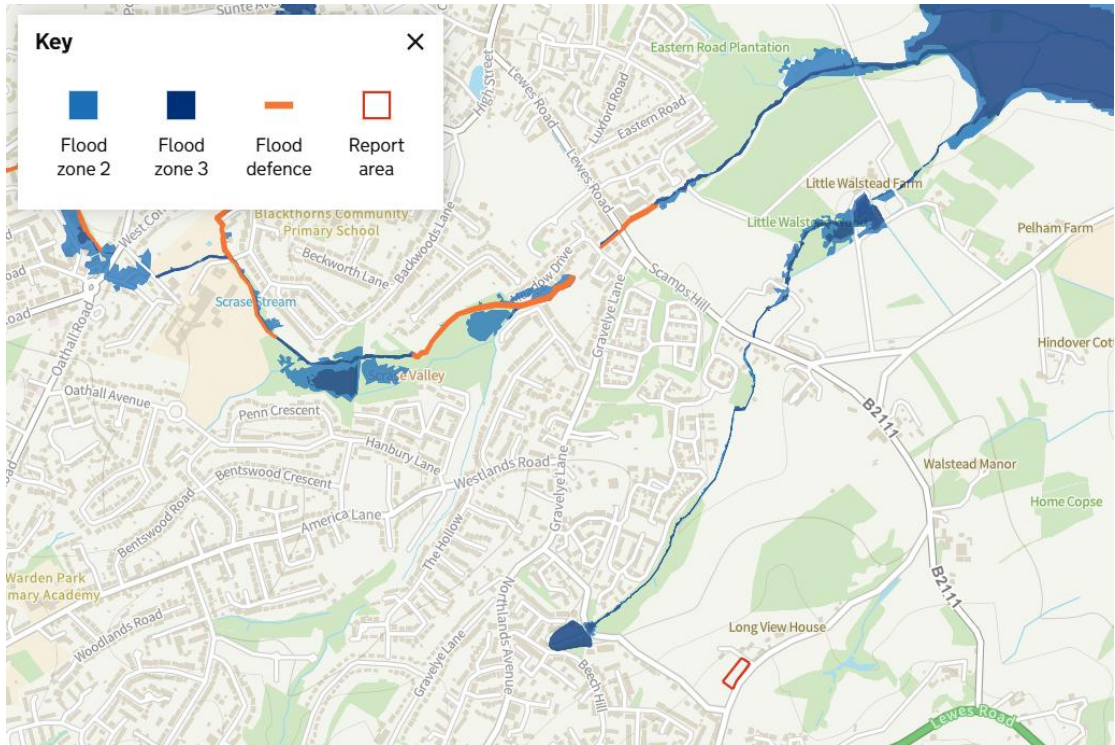
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-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m

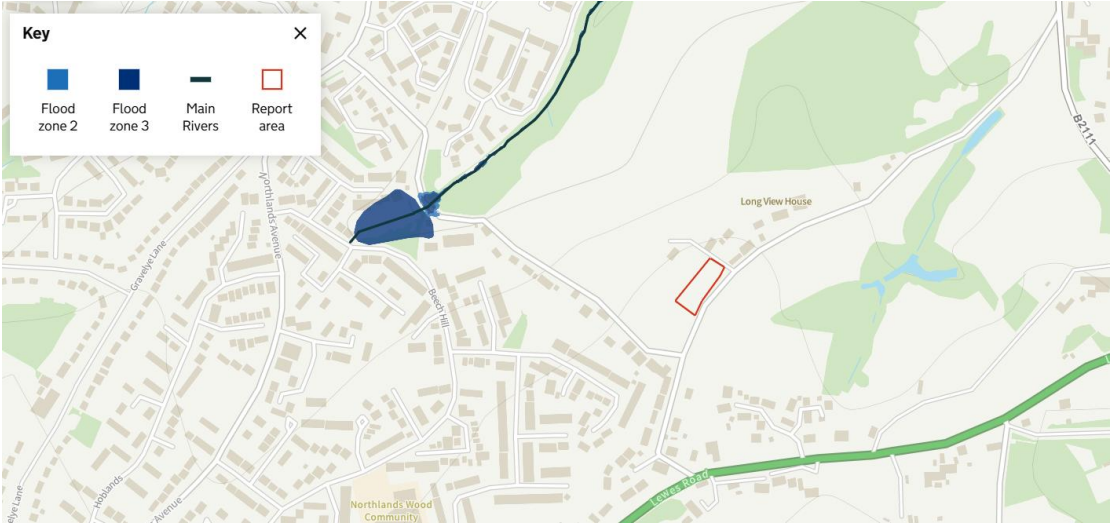
River Ouse tributary map



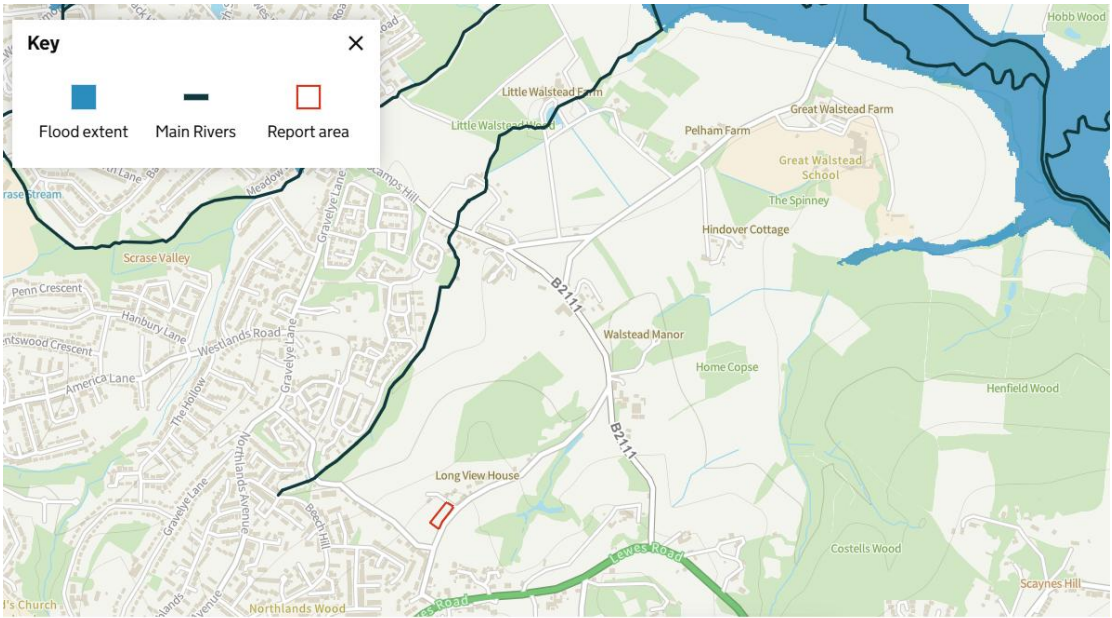
Flood defences



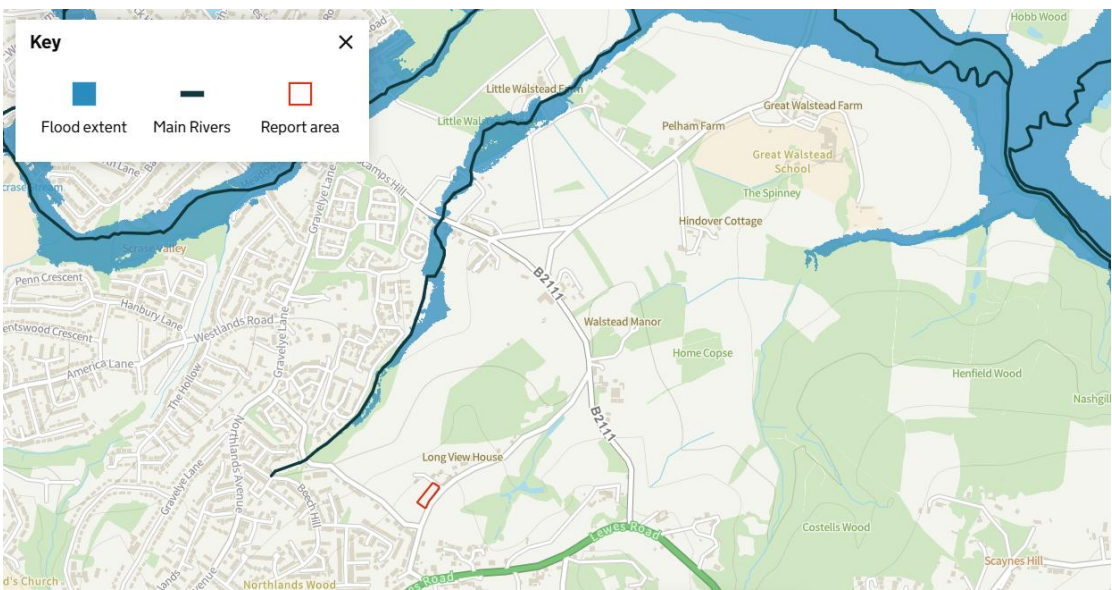
Flood zones 2 and 3



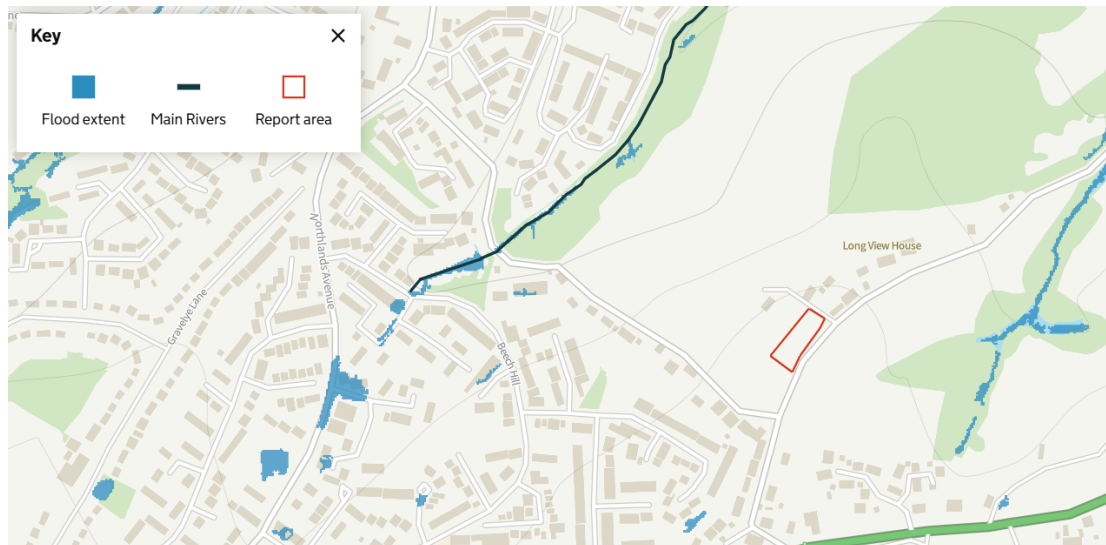
Rivers and sea flood risk for present day conditions



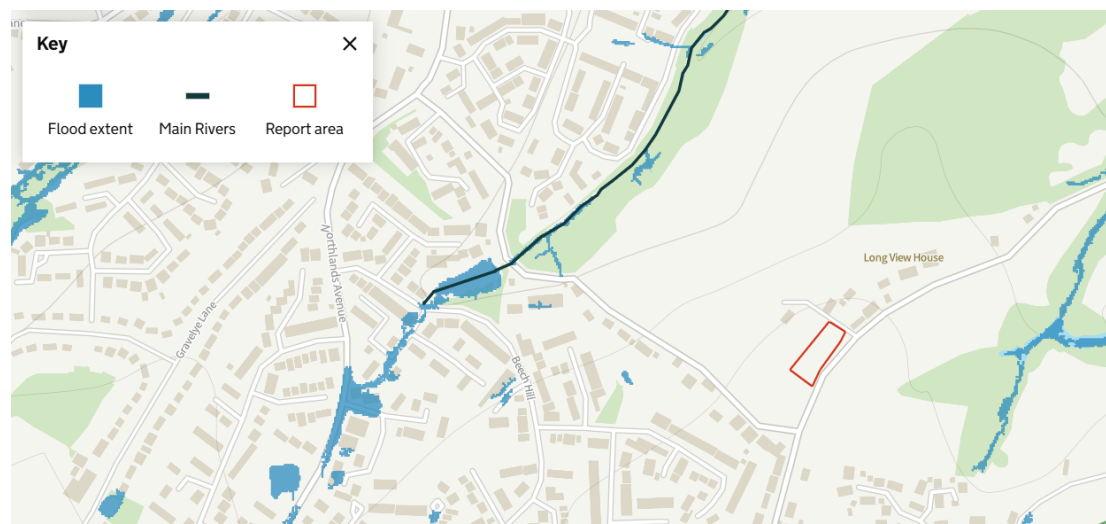
Rivers and sea flood risk accounting for climate change



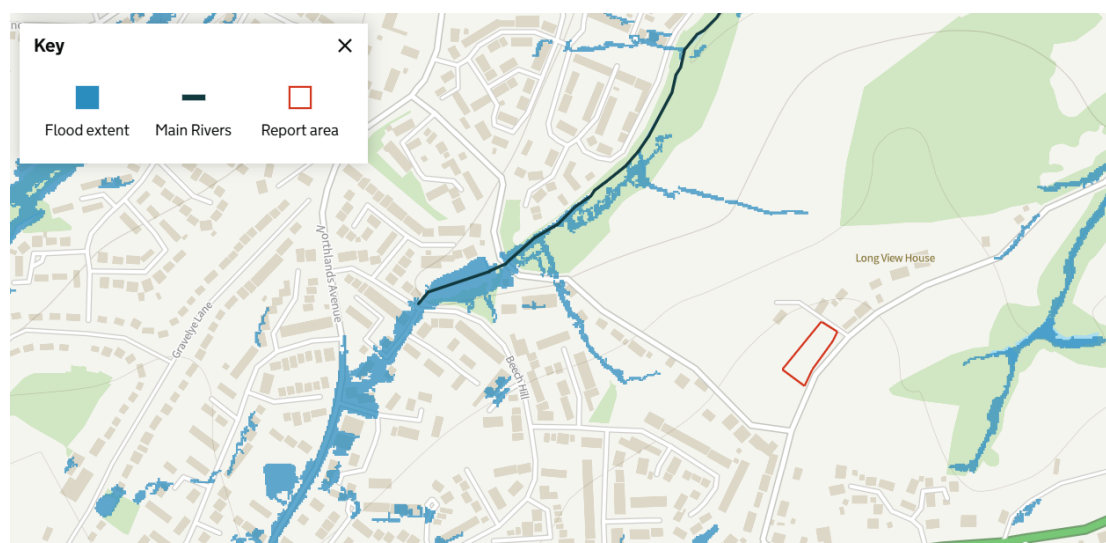
Surface water for a 1 in 30 annual likelihood of flooding



Surface water for a 1 in 100 annual likelihood of flooding



Surface water for a 1 in 1000 annual likelihood of flooding



APPENDIX C:
HR WALLINGFORD GREENFIELD FLOW

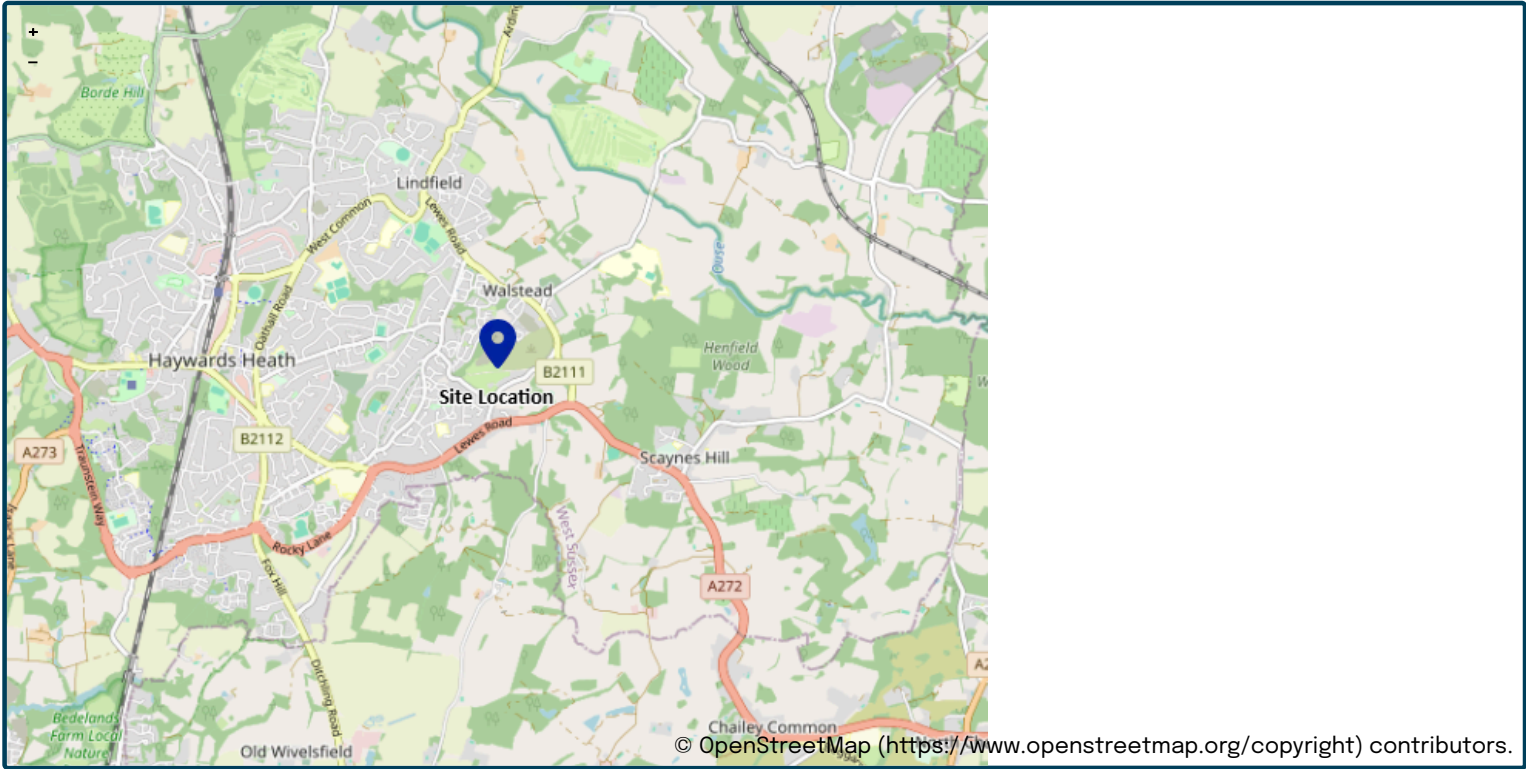
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	29/06/2026
Calculated by	EAS
Reference	798
Model version	2.2.3

Location

Site name	Pascotts Farm
Site location	Lindfield



Site easting (British National Grid)	535323
Site northing (British National Grid)	123802

Site details

Total site area (ha)	0.33	ha
----------------------	-----------------------------------	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	886	mm
BFIHOST19scaled	0.467	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	1.7	l/s
QBar (FEH statistical 2025) (l/s)	1.9	l/s

Growth curve factors

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

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	1.6
Flow rate 2 year (l/s)	1.7
Flow rate 10 years (l/s)	3.1
Flow rate 30 years (l/s)	4.4
Flow rate 100 years (l/s)	6.1
Flow rate 200 years (l/s)	7.1

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX D:

OUTPUT FROM DRAINAGE DESIGN SOFTWARE
AND ATTENUATION STORAGE CALCULATIONS



MasterDrain
HY 11.0

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Job No. 798		
Sheet no. 1		
Date 29/06/26		
By	Checked	Reviewed

Project **PASCOTTS FARM**

Title **Hydrological data for LINDFIELD (W.SUSSEX)**

Data:-

FSR values

Location = LINDFIELD (W.SUSSEX) Grid reference = TQ3425

M5-60 (mm) = 19.8 SAAR (mm/yr) = 850

r = 0.34 Soil = 0.45

Long reference = 534125 Area = England and Wales

Hydrological area = 7 Hydrological zone = 7

Soil classification for WRAP type 4

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

FEH values

c = -0.026 d1 = 0.367 d2 = 0.311

d3 = 0.404 e = 0.314 f = 2.470



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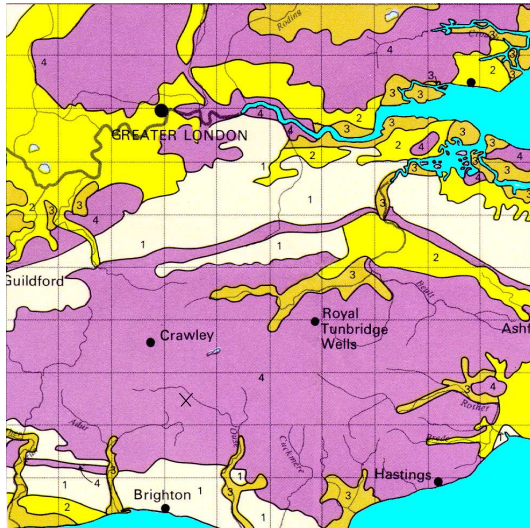
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Project **PASCOTTS FARM**

Title **Hydrological data for LINDFIELD (W.SUSSEX)**



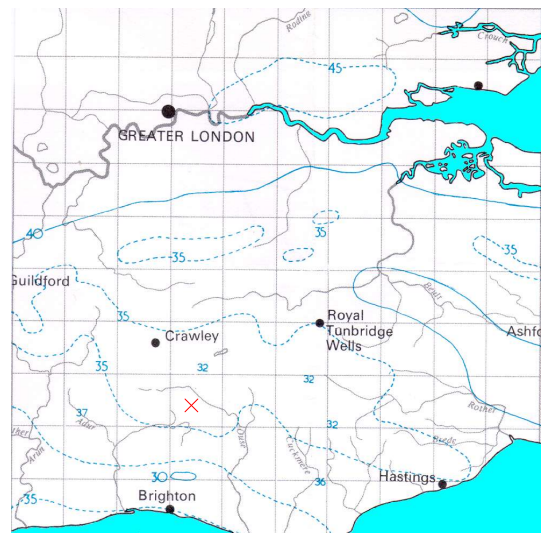
<- Soil

M5-60 ->



<- SAAR

r x 100 ->



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By	Checked	Reviewed

Project Pascotts Farm
Title Hydrograph storage analysis (Winter profile) for LINDFIELD (W.SUSSEX)

Data:-

FEH Hydrology:-

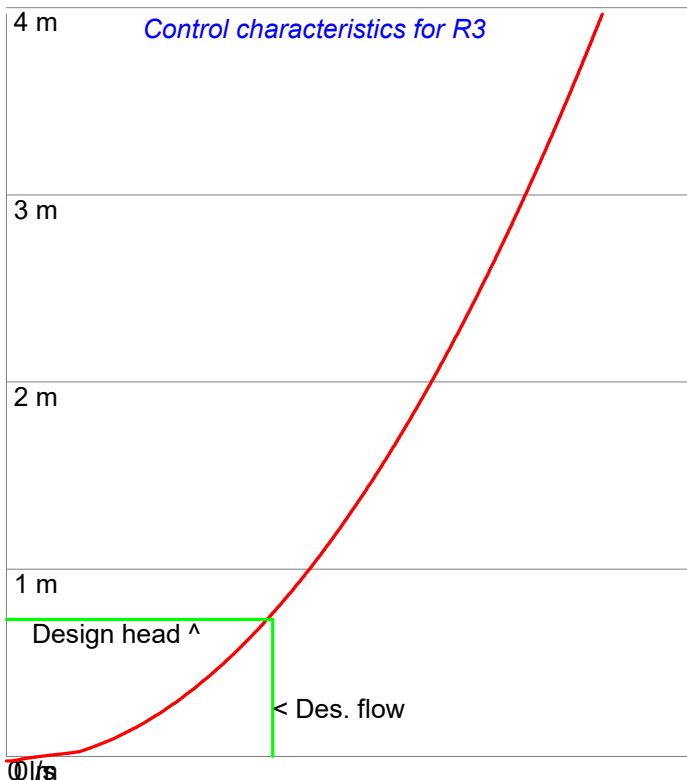
Location = LINDFIELD (W.SUSSEX) Grid reference = TQ3425
 $c = -0.0260$ $d1 = 0.3672$ $d2 = 0.3107$
 $d3 = 0.4041$ $e = 0.3139$ $f = 2.4700$
 Return period = 30 Climate change = 40%

Percentage runoff = 100.0% (manual setting)

Imperv. area = 562 m² Pervious area = 0 m²
 Total area = 562 m² Equiv area = 562 m² (Tot. area x % runoff).
 Total runoff = 39.6 m³ Discharge rate = 1.800 l/s

Design Head = 0.8m Peak flow = 1.80 l/s
 Control device = R3 Orifice diam = 39.7 mm
 Max. calc. depth = 0.8 m Available depth = 0.0 m³
 Mean discharge = 1.33 l/s

Available system storage = 0.00 m³ under a system plane at the design head level.
 Offline storage = 0.0 m³
 Total storage = 27.0 m³ Peak input flow = 6.88 l/s



Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.01	0.04	2.01	2.85
0.05	0.41	2.05	2.88
0.10	0.64	2.10	2.92
0.15	0.78	2.15	2.95
0.20	0.90	2.20	2.98
0.25	1.01	2.25	3.02
0.30	1.10	2.30	3.05
0.35	1.19	2.35	3.09
0.40	1.27	2.40	3.12
0.45	1.35	2.45	3.15
0.50	1.42	2.50	3.18
0.55	1.49	2.55	3.21
0.60	1.56	2.60	3.24
0.65	1.62	2.65	3.28
0.70	1.68	2.70	3.31
0.75	1.74	2.75	3.34
0.80	1.80	2.80	3.37
0.85	1.86	2.85	3.40
0.90	1.91	2.90	3.43
0.95	1.96	2.95	3.46
1.00	2.01	3.00	3.49
1.05	2.06	3.05	3.51
1.10	2.11	3.10	3.54
1.15	2.16	3.15	3.57
1.20	2.20	3.20	3.60
1.25	2.25	3.25	3.63
1.30	2.29	3.30	3.66
1.35	2.34	3.35	3.68
1.40	2.38	3.40	3.71
1.45	2.42	3.45	3.74
1.50	2.46	3.50	3.76
1.55	2.51	3.55	3.79
1.60	2.55	3.60	3.82
1.65	2.59	3.65	3.84
1.70	2.62	3.70	3.87
1.75	2.66	3.75	3.90
1.80	2.70	3.80	3.92
1.85	2.74	3.85	3.95
1.90	2.77	3.90	3.97
1.95	2.81	3.95	4.00
2.00	2.85	4.00	4.02

Calculation data provided by Crown Water Ltd, SL5 7NT



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Project **Pascotts Farm**
Title **Hydrograph storage analysis (Winter profile) for LINDFIELD (W.SUSSEX)**

Storage curves for a 4 hours storm.

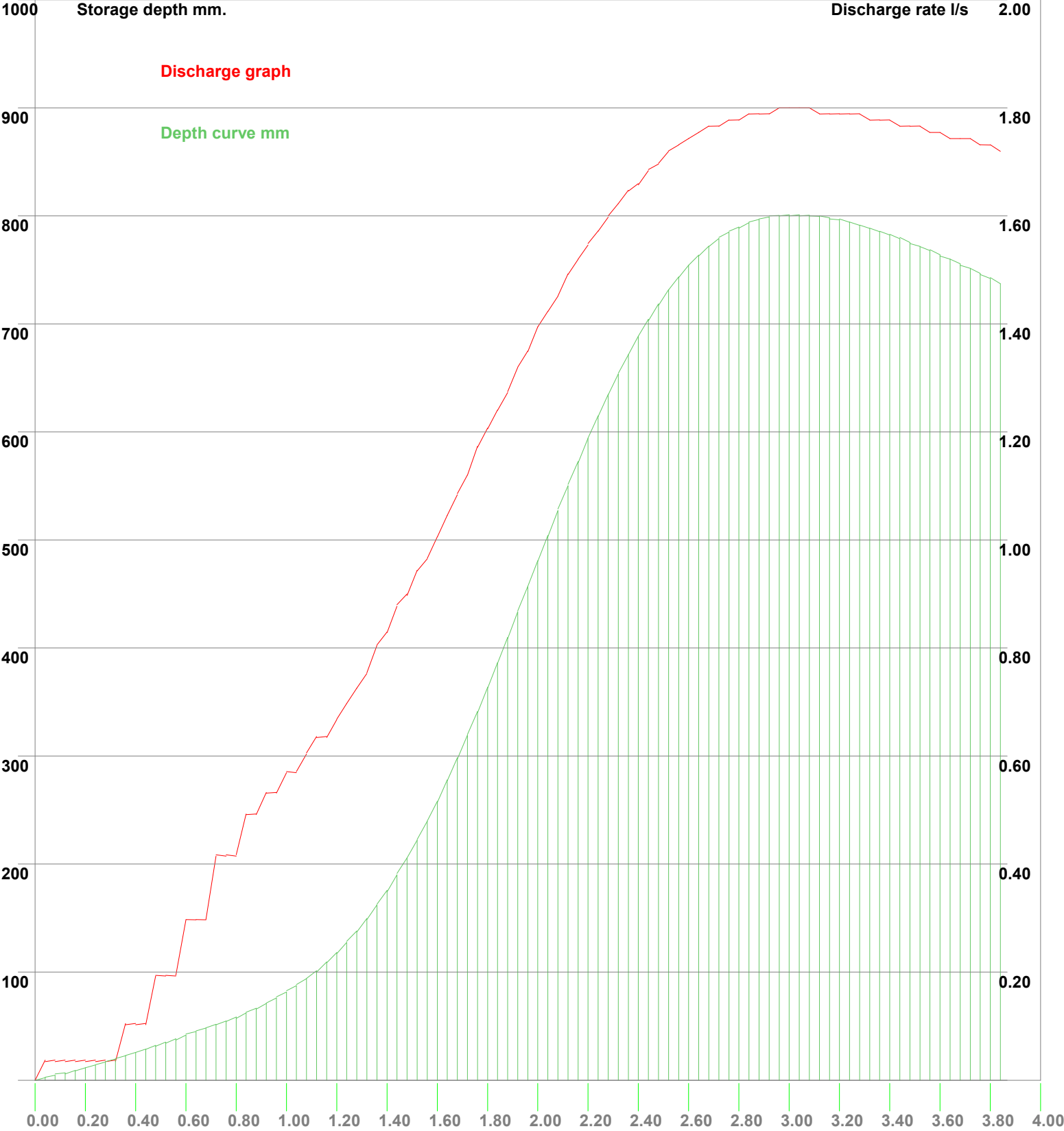
Storage depth mm.

Discharge rate l/s

2.00

Discharge graph

Depth curve mm





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			Sheet no. 3		
Project Pascotts Farm			Date 29/06/26		
Title Hydrograph storage analysis (Winter profile) for LINDFIELD (W.SUSSEX)			By	Checked	Reviewed

Incremental rainfall figures.

Storm Mins	Storage Depth mm	Control Flow l/s	Storm Mins	Storage Depth mm	Control Flow l/s
2.4	2.3	0.04	122.4	504.1	1.42
4.8	4.5	0.04	124.8	527.3	1.45
7.2	6.8	0.04	127.2	550.2	1.49
9.6	9.2	0.04	129.6	572.5	1.52
12.0	11.6	0.04	132.0	594.1	1.55
14.4	14.1	0.04	134.4	614.9	1.57
16.8	16.8	0.04	136.8	634.7	1.60
19.2	19.7	0.04	139.2	653.6	1.62
21.6	22.7	0.10	141.6	671.6	1.65
24.0	25.6	0.10	144.0	688.5	1.66
26.4	28.8	0.10	146.4	704.2	1.68
28.8	32.1	0.19	148.8	718.5	1.70
31.2	35.2	0.19	151.2	731.6	1.72
33.6	38.4	0.19	153.6	743.5	1.73
36.0	41.8	0.30	156.0	754.2	1.74
38.4	45.0	0.30	158.4	763.6	1.75
40.8	48.3	0.30	160.8	771.9	1.77
43.2	51.7	0.41	163.2	779.1	1.77
45.6	54.9	0.41	165.6	784.9	1.78
48.0	58.4	0.41	168.0	789.7	1.78
50.4	62.4	0.49	170.4	793.6	1.79
52.8	66.5	0.49	172.8	796.6	1.79
55.2	71.1	0.53	175.2	798.9	1.79
57.6	76.1	0.53	177.6	800.3	1.80
60.0	81.6	0.57	180.0	800.9	1.80
62.4	87.5	0.57	182.4	801.0	1.80
64.8	94.1	0.60	184.8	800.6	1.80
67.2	101.4	0.64	187.2	799.6	1.79
69.6	109.4	0.64	189.6	798.2	1.79
72.0	118.1	0.67	192.0	796.3	1.79
74.4	127.6	0.70	194.4	794.0	1.79
76.8	138.0	0.73	196.8	791.3	1.79
79.2	149.6	0.75	199.2	788.4	1.78
81.6	162.3	0.80	201.6	785.4	1.78
84.0	175.6	0.83	204.0	782.2	1.78
86.4	190.2	0.88	206.4	778.9	1.77
88.8	205.7	0.90	208.8	775.3	1.77
91.2	222.2	0.94	211.2	771.7	1.77
93.6	239.6	0.97	213.6	767.9	1.75
96.0	258.3	1.01	216.0	764.1	1.75
98.4	277.9	1.05	218.4	760.0	1.74
100.8	298.4	1.08	220.8	755.7	1.74
103.2	319.5	1.12	223.2	751.3	1.74
105.6	341.2	1.17	225.6	746.7	1.73
108.0	363.6	1.21	228.0	742.0	1.73
110.4	386.5	1.24	230.4	737.2	1.72
112.8	409.8	1.27	232.8	732.3	1.72
115.2	433.5	1.32	235.2	727.5	1.71
117.6	457.1	1.35	237.6	722.5	1.71
120.0	480.7	1.39	240.0	717.6	1.70

Using the Get Max button causes the program to step through a series of storm durations until a maximum volume is obtained.

Each duration is sampled 600 times and the results recorded. The storm durations (hrs) are:-

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

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



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4

Date

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Project
Pascotts Farm

Title
Hydrograph storage analysis (Winter profile) for LINDFIELD (W.SUSSEX)

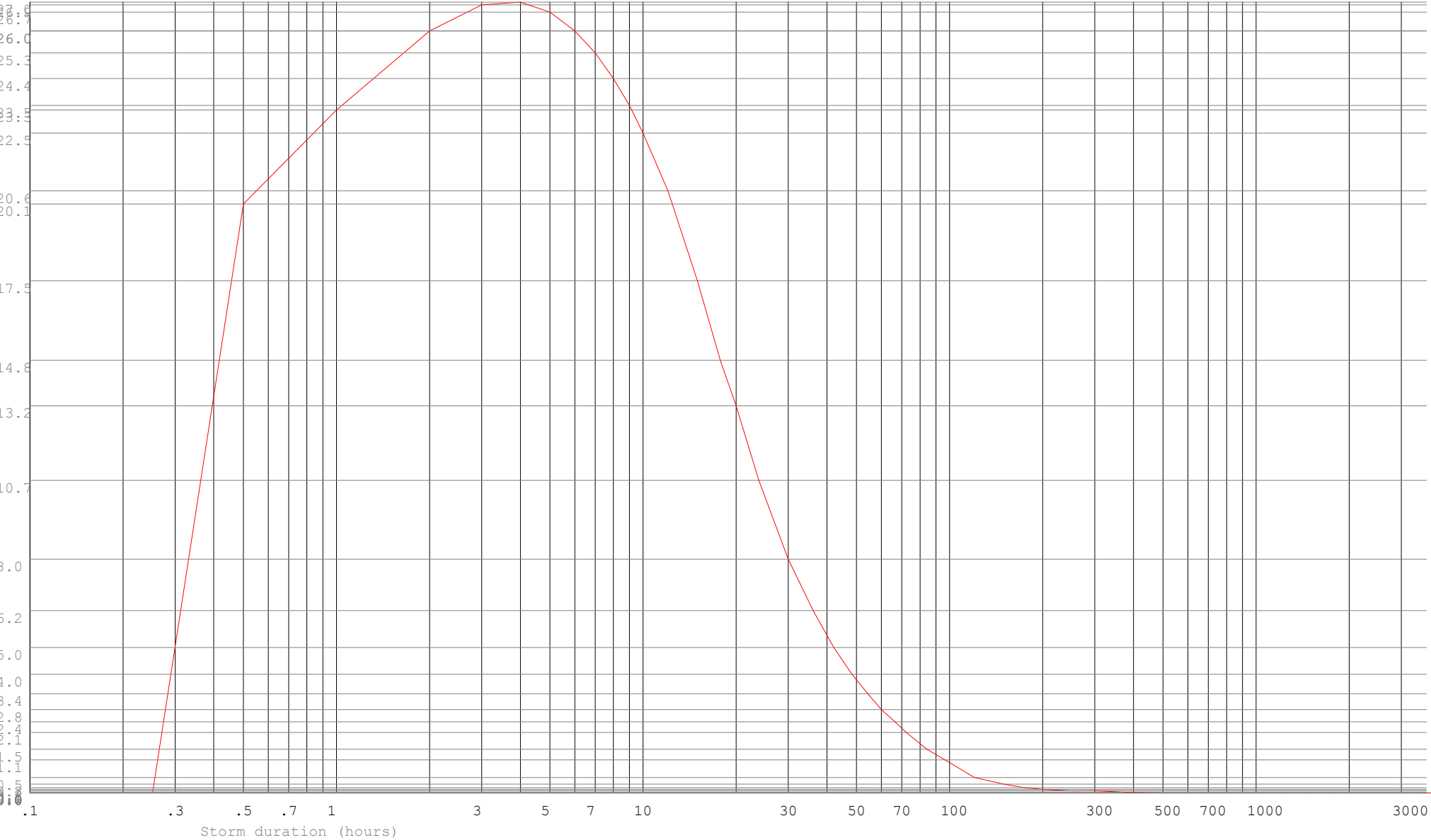
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Sequential storage volume at specific storm durations.

m³





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Job No. 798		
Sheet no. 1		
Date 30/06/26		
By	Checked	Reviewed

Project Pascotts Farm	By	Checked	Reviewed
Title Surcharge calcs for PASCOTTS FARM CCF = 45%			

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 45

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

Mean rain intens. 299.00 mm/hr
Storm profile = Summer
Using FEH data

Peak rain intens. 1172.08 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE		EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) :x FACTOR :	STATUS	
1	I	1.01	SW1	17.8	20.9	150	900	19.90	20.09	20.40	1.17	0.19	3.08	0.000	146	Surch.
2	I	1.02	SW2	18.1	32.4	150	450	19.61	20.43	20.80	1.79	0.82	14.28	0.000	227	Surch.
3	B	2.01	SW3	14.0	14.8	100	450	20.00	20.14	20.50	1.06	0.14	0.82	0.000	103	Surch.
4	I	1.03	SW4	52.2	58.6	225	450	19.45	19.98	20.40	1.12	0.53	6.46	0.000	410	Surch.
5	B	3.01	SW5	18.4	17.6	100	450	20.20	20.29	20.70	0.96	0.09	0.00	0.000	123	OK
6	I	1.04	STORAGE#	6.3	1.8	100	4771	19.17	19.20	20.20	0.28	0.03	0.00	0.000	534	OK
7	I	1.05	SW6	6.7	0.0	100	450	19.09	19.09	20.00	0.00	0.00	0.00	0.000	0	OK



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Date 30/06/26		
By	Checked	Reviewed

Project	Pascotts Farm
Title	Surcharge calcs for PASCOTTS FARM CCF = 45%

Notes

Printout headings

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

Title box

Hydrograph data

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

Flow restrictors

Manhole reference - STORAGE

Restrictor flowrate - 1.8 l/s

Flood volumes

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



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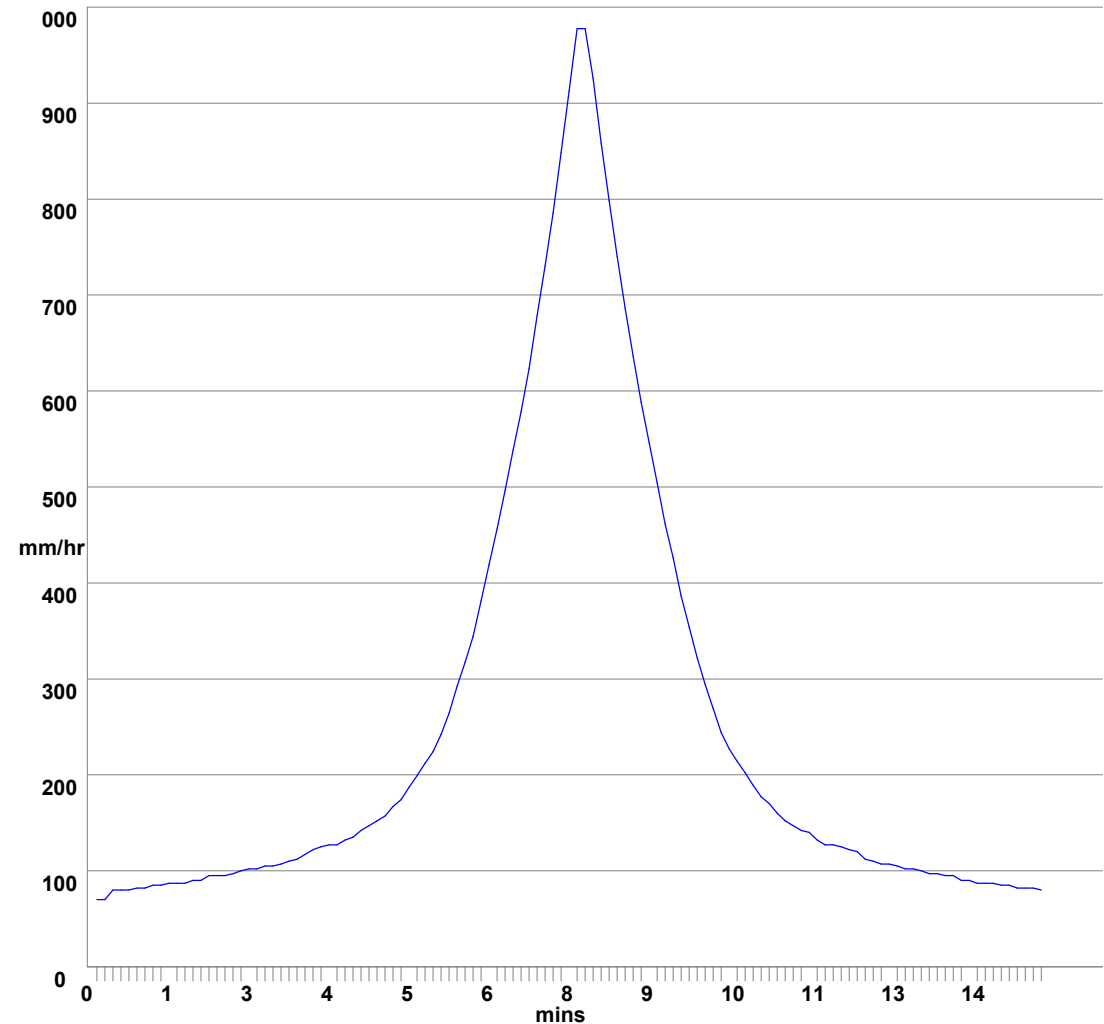
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Project Pascotts Farm
Title Surcharge calcs for PASCOTTS FARM CCF = 45%

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:08	69.80	5:08	199.43	10:08	214.38
0:15	69.80	5:15	211.89	10:15	201.92
0:22	79.77	5:22	224.35	10:22	189.45
0:30	79.77	5:30	241.80	10:30	176.99
0:38	79.77	5:38	264.24	10:38	169.51
0:45	82.26	5:45	291.66	10:45	159.54
0:52	82.26	5:52	316.59	10:52	152.06
1:00	84.76	6:00	344.01	11:00	147.08
1:08	84.76	6:08	381.40	11:08	142.09
1:15	87.25	6:15	418.79	11:15	139.60
1:22	87.25	6:22	456.19	11:22	132.12
1:30	87.25	6:30	496.07	11:30	127.13
1:38	89.74	6:38	538.45	11:38	127.13
1:45	89.74	6:45	578.33	11:45	124.64
1:52	94.73	6:52	623.20	11:52	122.15
2:00	94.73	7:00	678.05	12:00	119.66
2:08	94.73	7:08	730.39	12:08	112.18
2:15	97.22	7:15	785.24	12:15	109.68
2:22	99.71	7:22	847.56	12:22	107.19
2:30	102.21	7:30	912.37	12:30	107.19
2:38	102.21	7:38	977.18	12:38	104.70
2:45	104.70	7:45	977.18	12:45	102.21
2:52	104.70	7:52	924.83	12:52	102.21
3:00	107.19	8:00	857.53	13:00	99.71
3:08	109.68	8:08	797.70	13:08	97.22
3:15	112.18	8:15	740.37	13:15	97.22
3:22	117.16	8:22	685.52	13:22	94.73
3:30	122.15	8:30	635.67	13:30	94.73
3:38	124.64	8:38	588.30	13:38	89.74
3:45	127.13	8:45	545.93	13:45	89.74
3:52	127.13	8:52	503.55	13:52	87.25
4:00	132.12	9:00	461.17	14:00	87.25
4:08	134.61	9:08	426.27	14:08	87.25
4:15	142.09	9:15	386.39	14:15	84.76
4:22	147.08	9:22	353.98	14:22	84.76
4:30	152.06	9:30	321.57	14:30	82.26
4:38	157.05	9:38	294.15	14:38	82.26
4:45	167.02	9:45	269.22	14:45	82.26
4:52	174.50	9:52	244.30	14:52	79.77
5:00	186.96	10:00	226.85	15:00	79.77

Hydrograph profile derived from data in the Flood Studies Report

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





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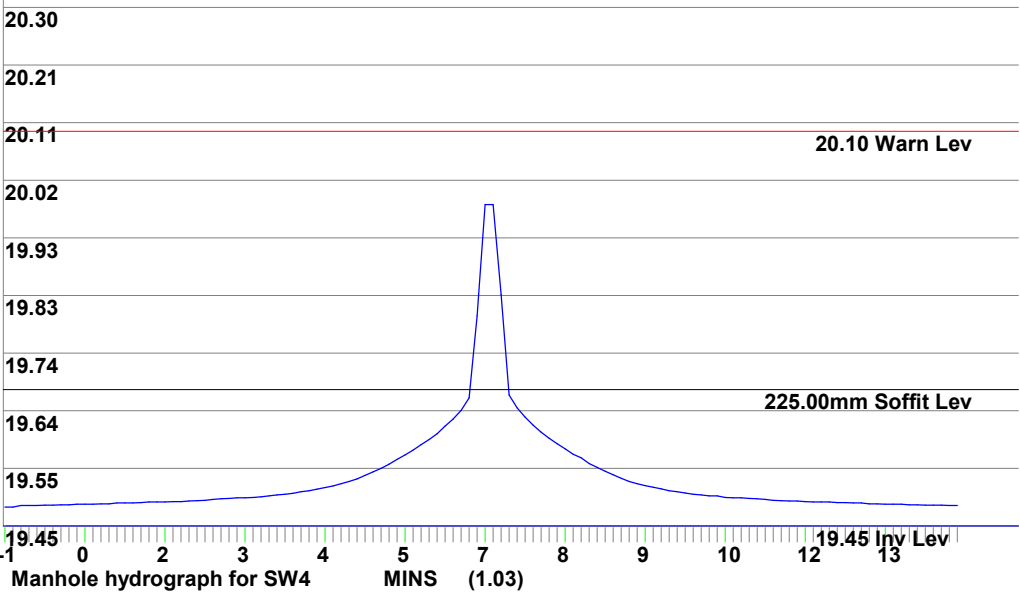
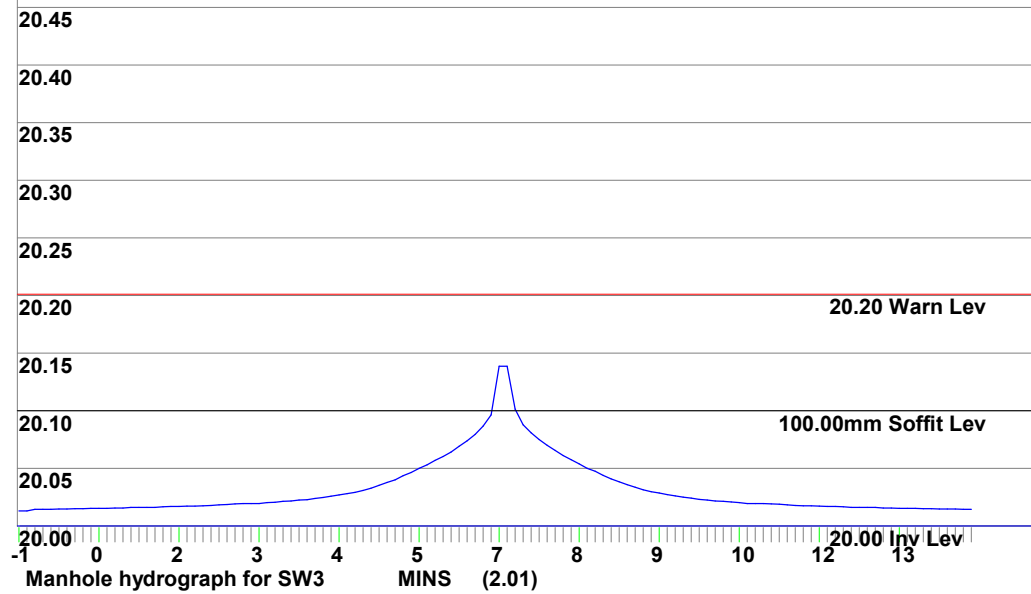
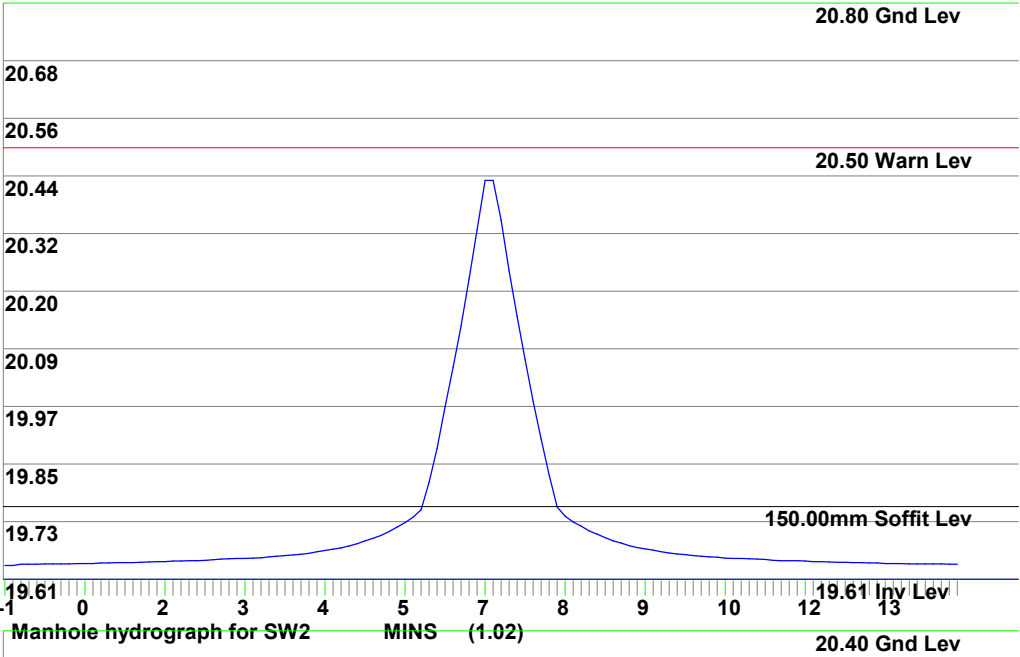
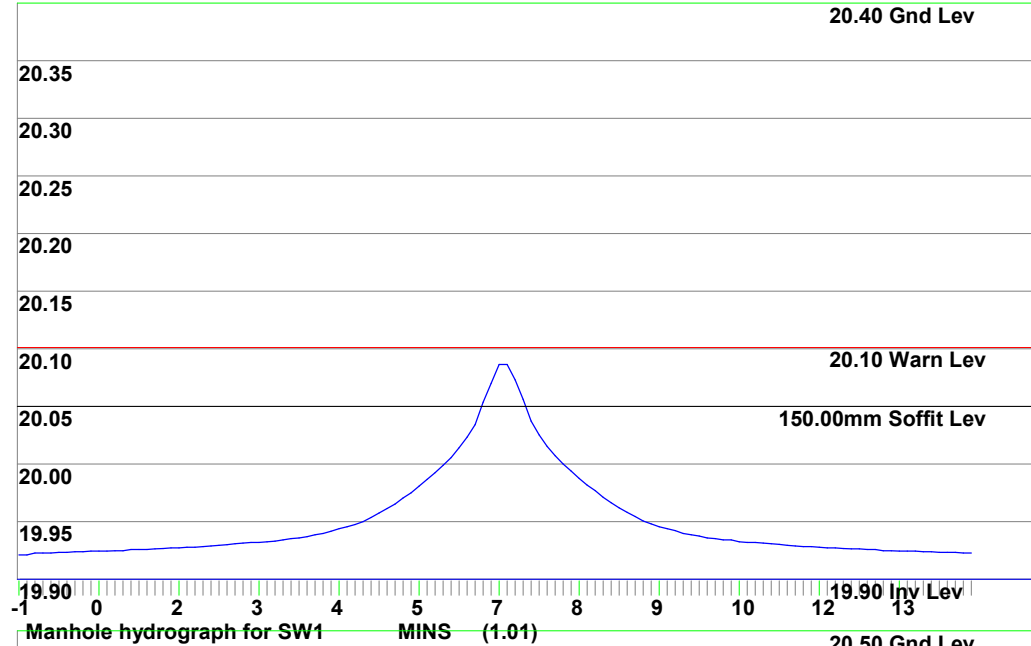
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Sheet no. 4		
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Project Pascotts Farm	By	Checked	Reviewed
Title Surcharge calcs for PASCOTTS FARM CCF = 45%			





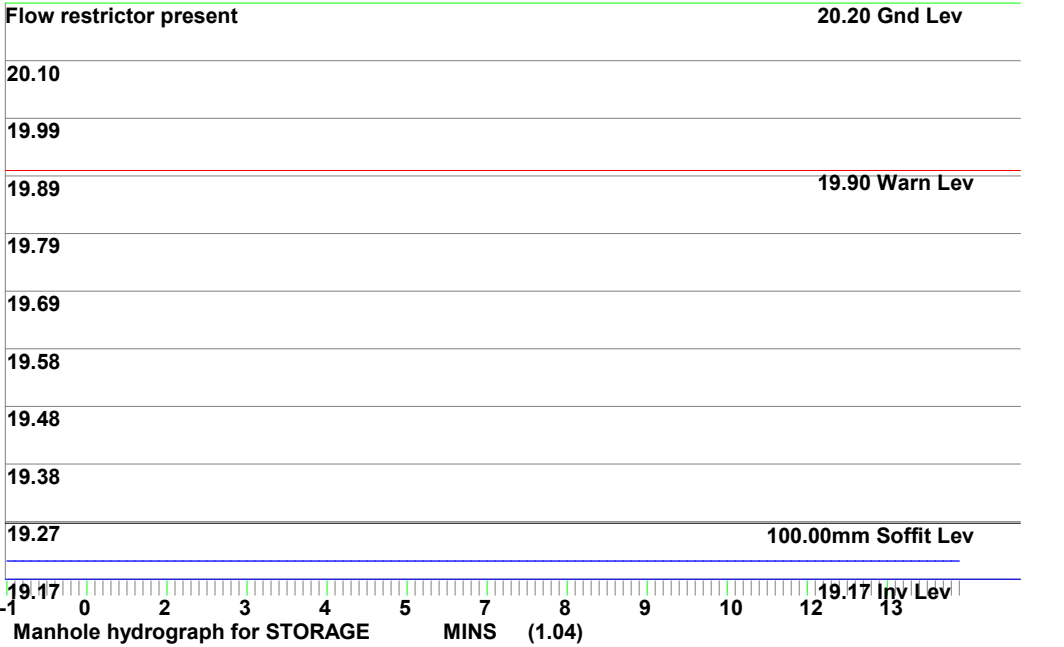
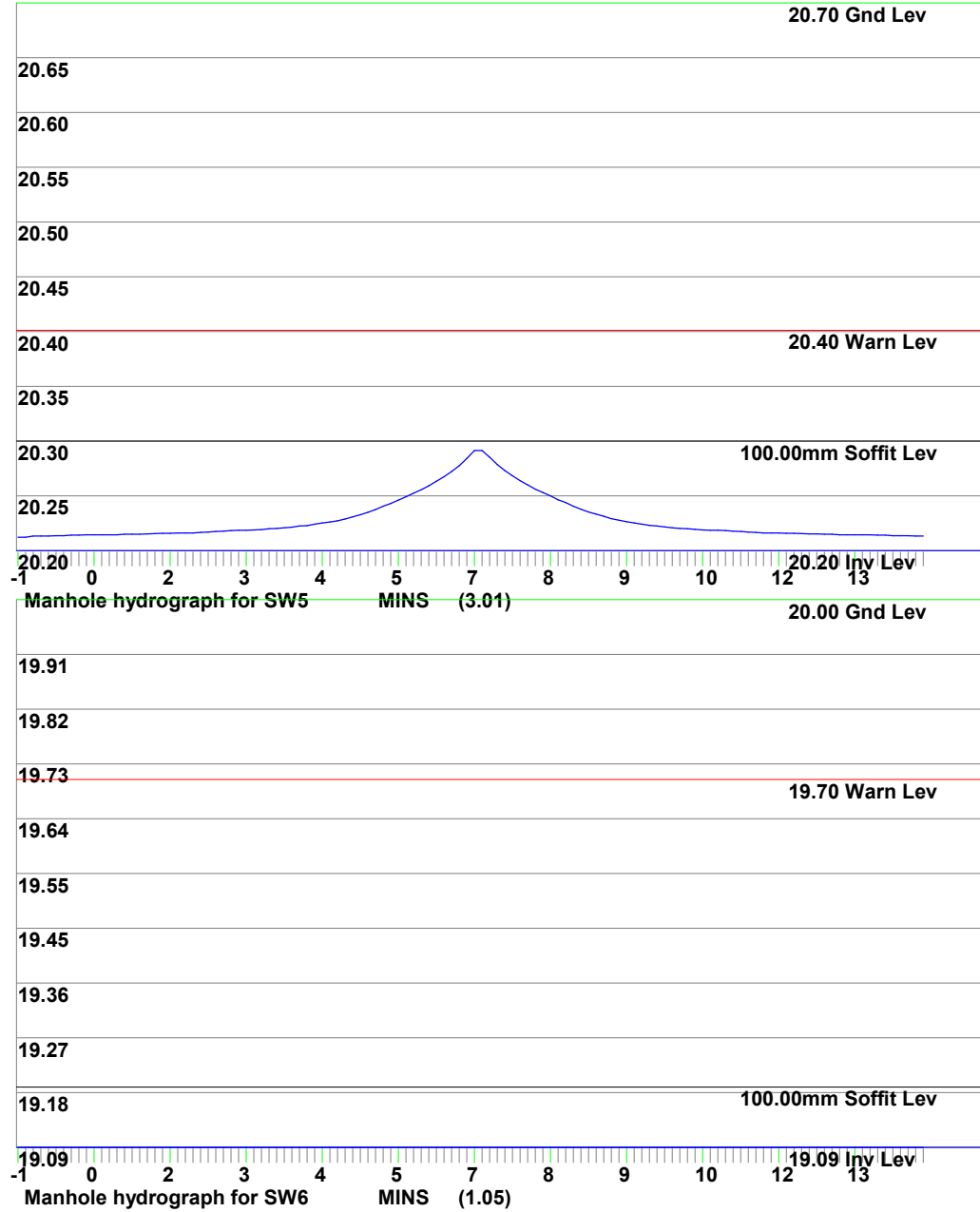
MasterDrain
SW

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Title						
				Surcharge calcs for PASCOTTTS FARM CCF = 45%		



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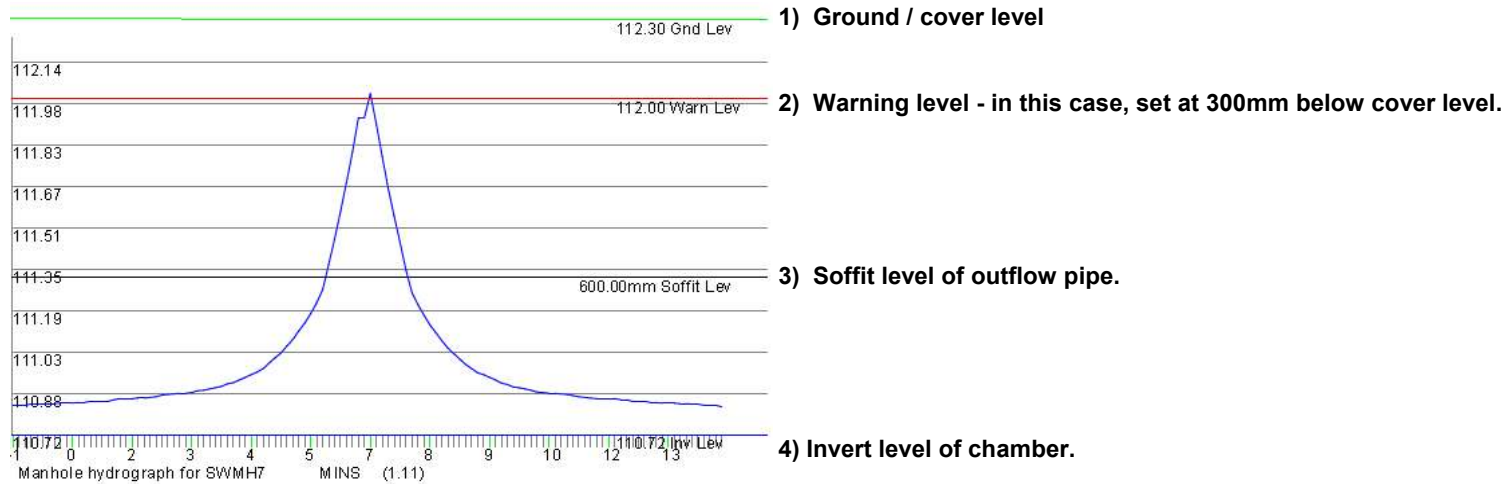
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Project
Pascotts Farm

Title
Surcharge calcs for PASCOTTS FARM CCF = 45%



Notes

- Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
- Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
- The top of the graph clips the warning level and would be marked thus on the printout.
- In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.
- The diagram above is a general one and is not part of the current calculation.

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		Date 30/06/26 12:38		
Project Pascotts Farm		By	Checked	Reviewed
Title Manhole printout for PASCOTTS FARM				

Manhole ref.	X ref	Y ref	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Exit Diam	Exit Crown	Exit Invert	Chamb const	Slab level	Cover Level	Dwnstr MH
SW1	57.3	54.9	circ	900	N/A	0.50		0.32	150	20.075	19.900	N/A	19.850	20.400	SW2
SW2	41.9	30.8	circ	450	N/A	1.19		0.19	150	19.785	19.610	N/A	19.560	20.800	SW4
SW3	35.3	45.9	circ	450	N/A	0.50		0.08	100	20.125	20.000	N/A	19.950	20.500	SW4
SW4	28.4	38	circ	450	N/A	0.95		0.15	225	19.700	19.450	N/A	19.400	20.400	STORAGE
SW5	17	18.5	circ	450	N/A	0.50		0.08	100	20.325	20.200	N/A	20.150	20.700	STORAGE
STORAGE	5.9	21.7	circ	4771	N/A	1.03		18.41	100	19.295	19.170	N/A	19.120	20.200	SW6
SW6	0.6	16.7	circ	450	N/A	0.91		0.14	100	19.215	19.090	N/A	19.040	20.000	DITCH

All manholes to be as per 'Sewers for Adoption'

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Sheet no.
2

Date
30/06/26 12:38

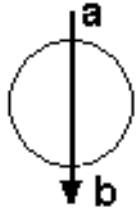
Project
Pascotts Farm

Title
Manhole printout for PASCOTTS FARM

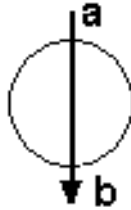
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Checked

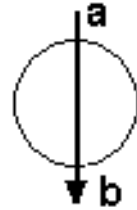
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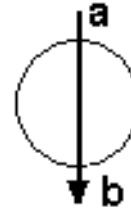
MH = SW1
a=head
b = 150



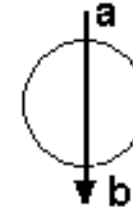
MH = SW2
a= 150
b = 150



MH = SW3
a=head
b = 100



MH = SW4
a= 150
b = 225
c = 100
d = 150



MH = SW5
a=head
b = 100

MH = STORAGE
a= 225
b = 100
c = 100
d = 225

MH = SW6
a= 100
b = 100

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		Sheet no. 3		
		Date 30/06/26 12:38		
Project Pascotts Farm	By Checked Reviewed 			
Title Manhole printout for PASCOTTS FARM				

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

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



MasterDrain
Foul 11.5

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				Sheet no. 0		
				Date 29/06/26		
Project Pascotts Farm				By	Checked	Reviewed
Title Manhole printout for PASCOTTS FARM.FL						

Manhole ref.	Form	Cham diam. or length	Rect. width	Chamb. height	Shaft height	MH Volume	Ent. Diam	Ent. Crown	Ent. Invert	Exit Diam	Exit Crown	Exit Invert	Chamb const	Cover Level	Dwnstr MH
FW1	circ	450	N/A	0.50		0.08	Head	----	----	100	20.025	19.900	N/A	20.400	FW2
FW2	circ	450	N/A	0.81		0.13	100	0.000	0.000	100	19.815	19.690	N/A	20.500	STP

All manholes to be as per 'Sewers for Adoption'

Levels calculated for level inverts



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Foul 11.5

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Project Pascotts Farm	By	Checked	Reviewed
Title Manhole printout for PASCOTTS FARM.FL			

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

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- 7) Manhole volume - cubic capacity of manhole chamber
- 8) Exit diameter - diameter of pipe leaving this manhole
- 9) Exit crown - crown level of pipe leaving this manhole
- 10) Exit invert - invert level of pipe leaving this manhole
- 11) Manhole diameters of 9999 have exceeded the sizes available in Sfa
- 12) Manhole diameters may have to be modified due to the number of branches

APPENDIX E: PHOTOGRAPHS

Borehole drilling for percolation testing



Borehole 1



Borehole 2



Borehole 3



Borehole 4



Pond at south of site



Overgrown drainage ditch



North east adjacent field



Pallett used as bridge over drainage ditch



Construction site north of Pascott's Farm



Construction site north of Pascott's Farm

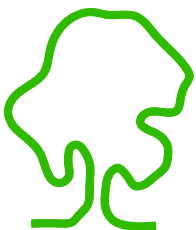


Drainage ditch runs along left parallel to site boundary



Waterflow from ditch travels north through drains





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