Flood Risk Assessment and Surface Water Drainage Strategy

AEG0387_SO40_Calmore_07

Site Address: Land North of The Hollies
Hill Street
Calmore
New Forest
SO40 2RX

UK Experts in Flood Modelling, Flood Risk Assessments, and Surface Water Drainage Strategies

Document Issue Record

Project: Flood Risk Assessment and Surface Water Drainage Strategy

Prepared for: Osman Homes Limited

Reference: AEG0387_SO40_Calmore_07

Site Location: Land North of The Hollies, Hill Street, Calmore, New Forest, SO40 2RX

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Please Note:

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Summary

Development Description	Existing	Proposed
Development Type	Greenfield parcel of land	Construction of 9 houses with associated access and parking
EA Vulnerability Classification	Water Compatible	More Vulnerable
Ground Level	Ground levels on site vary between 20.24m AOD to 26.10m AOD based on the topographic survey provided.	No change in ground levels proposed
Level of Sleeping Accommodation	None	N/A[2]
Impermeable Surface Area	None	Approximately 3,210m^2 (0.321 hectares)
Surface Water Drainage	N/A[1]	Runoff to be attenuated on site prior to discharge to the ditch at the south of the site. Total runoff rate of 2 l/s from the site (1 l/s per outfall). Outfalls subject to agreement from the LLFA.
Site Size	Approximately 10,125m^2 (1.01 hectares)	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone	Flood Zone 1	
Flood Source	Pluvial and Groundwater	
SFRA Available	Yes – New Forest District Council Strategic Flood Risk Assessment (SFRA, 2018)	
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels	Yes	Site in Flood Zone 1, and dwellings to be sequentially located outside 1:1000 year pluvial extent
Safe Access/Egress Route	Yes	Site in Flood Zone 1, and safe access/ egress possible in 1:1000 year pluvial event. Refuge on site in worst case scenario
Flood Resilient Design	Yes	See Section 5 of this report
Site Drainage Plan	Yes	Runoff to be attenuated on site prior to discharge to the ditch at the south of the site. Total runoff rate of 2 l/s from the site (1 l/s per outfall). Outfalls subject to agreement from the LLFA.

Flood Warning & Evacuation Plan	Not required	Site in Flood Zone 1, and safe access/ egress possible in 1:1000 year pluvial event. Refuge on site in worst case scenario
Offsite Impacts	Summary	Comment
Displacement of floodwater	None	Site in Flood Zone 1, and dwellings to be sequentially located outside 1:1000 year pluvial extent
Increase in surface run-off generation	Negligible	Total runoff rate of 2 l/s from the site (1 l/s per outfall). This is slight increase compared to Q_{BAR} rate but is the lowest practical rate, as lower rates could increase risk of blockage in the system
Impact on hydraulic performance of channels	Negligible	Outfalls to ditch are subject to agreement from the LLFA

[1] not required for this assessment

[2] data not available.

1. Introduction

1.1. Aegaea were commissioned by Osman Homes Limited to undertake a Flood Risk Assessment (FRA) and Surface Water Drainage Strategy (SWDS) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.

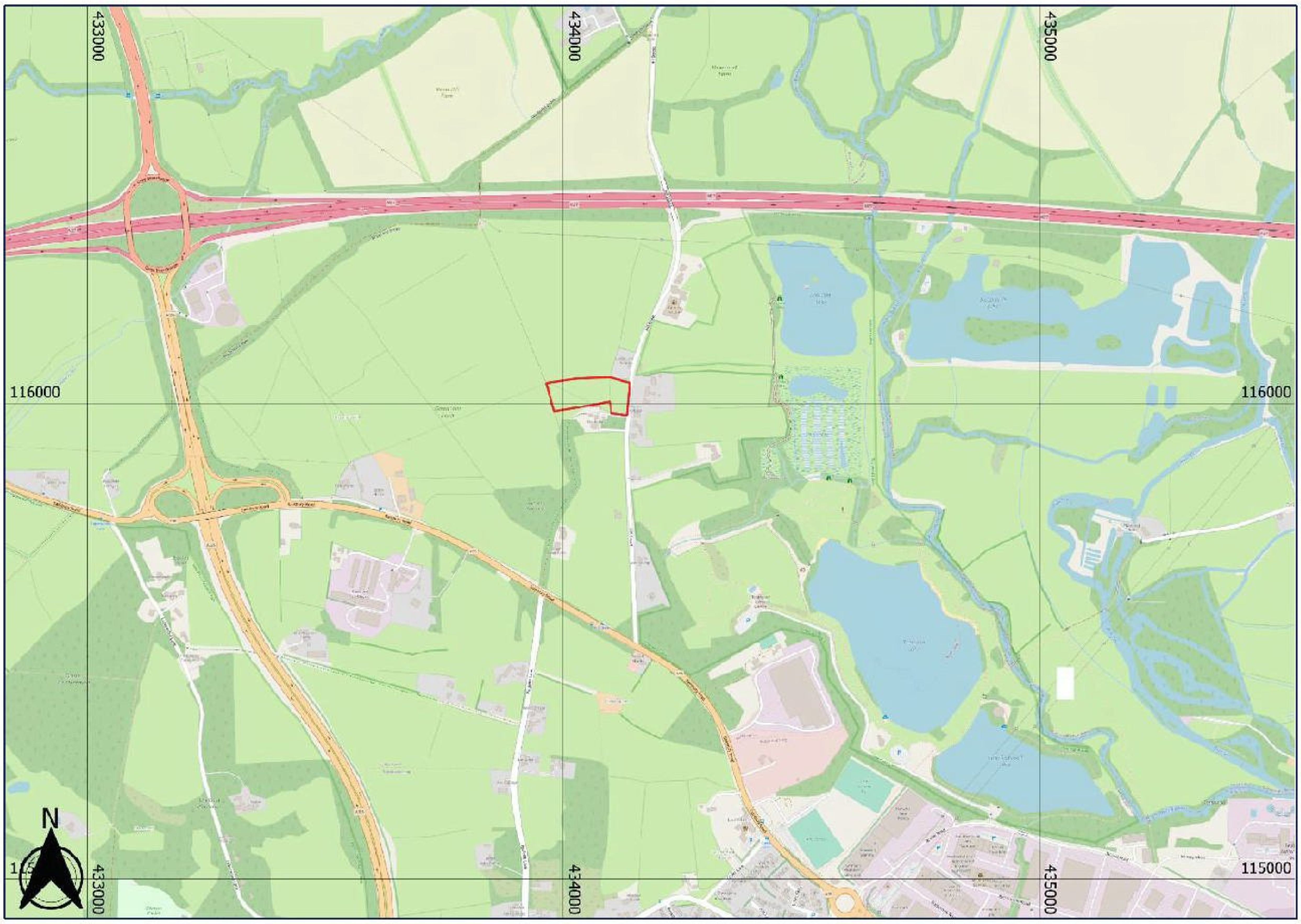
1.2. This FRA and SWDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

1.3. The site of the proposed development is Land North of The Hollies, Hill Street, Calmore, New Forest, SO40 2RX (Figure 1).

1.4. The site is currently a greenfield parcel of land north of The Hollies. The site is roughly divided into three sections by existing trees and hedgerows.

1.5. A topographic survey provided by the client (Appendix A) indicates and existing ditch flowing west to east along part of the southern boundary of the site, before flowing into a pipe/ culvert and emerging as a ditch adjacent to the highway southeast of the site. For the location of this pipe/ ditch, please see the Drainage Layout in Appendix C of this report.



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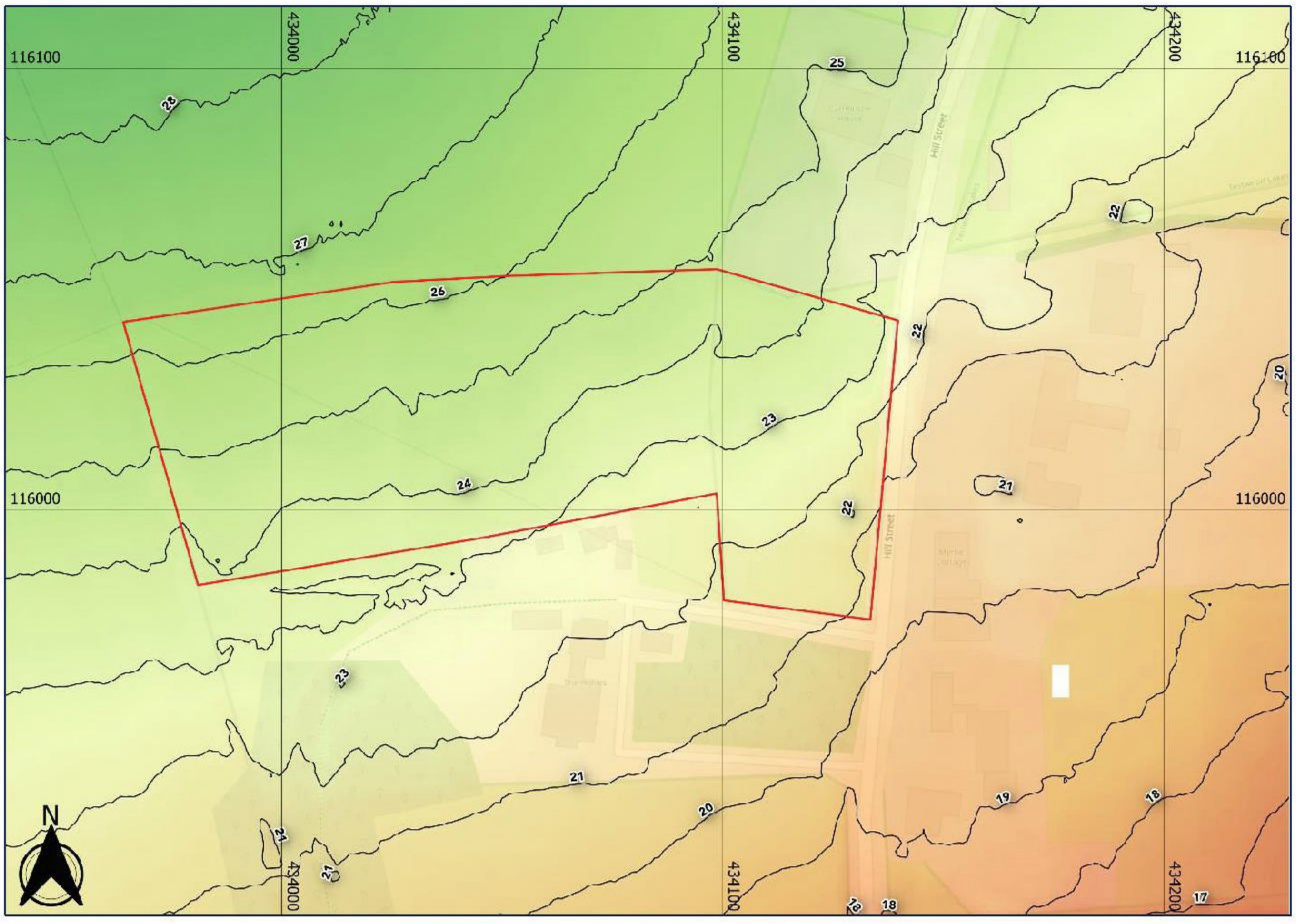

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Planning Policy and Guidance

1.10. UK government planning guidance states[1] that an FRA is required for sites which are:

- *In Flood Zone 2 or 3 including minor development and change of use,*
- *More than 1 hectare in Flood Zone 1,*
- *Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than river and the sea (for example surface water drains or reservoirs),*
- *In an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.*

1.11. The site is located within Flood Zone 1. If it is on land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use then according to NPPF Footnote 55 an FRA is required. It is understood that the LPA have requested an FRA to accompany the planning application for the proposed development due to historic flooding within the wider area.

1.12. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk
- Surface water flood risk
- Risk of flooding from other sources.

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[1] **https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment**

2. National Planning Policy Framework

2.1. The potential consequences of inappropriate development in a flood risk area for occupiers, either of the development or elsewhere, pose significant risks in terms of personal safety and damage to property. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. The following section summarises the key policies and guidance relevant to the proposed development.

2.2. The National Planning Policy Framework[2] (NPPF) (DCLG, 2021) includes Government policy on development and flood risk stating that:

> *"159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.*
>
> *167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
>
> *a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
>
> *b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
>
> *c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
>
> *d) any residual risk can be safely managed; and*

[2] https://www.gov.uk/guidance/national-planning-policy-framework, **last updated July 2021**

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55. "

2.3. Footnote 55 of the NPPF states:

"A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

2.4. Flood Zones in England are defined in **Error! Reference source not found.**[3] as follows:

[3] **https://www.gov.uk/guidance/flood-risk-and-coastal-change**

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zone 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

2.5. An FRA should be appropriate to the scale, nature and location of the development and should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

2.6. An assessment of any hydrological impacts should be assessed including an assessment of impacts on surface water runoff and impacts to the drainage network to demonstrate how flood risk to others will be managed following development and taking climate change into account.

2.7. The Planning Practice Guidance (substantially revised in March 2015 in relation to drainage) requires that sustainable drainage systems should be considered and included where practicable, in line with DEFRA Technical Standards[4].

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4 Technical Standards Accessed Online
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

Local Plan

2.8. The New Forest District Council Local Plan[5] (2020) states:

> *Policy CCC1: Safe and healthy communities*
>
> *i. Development should not result in pollution or hazards which prejudice the health and safety of communities and their environments, including air quality and the water environment. Where necessary to enable development to take place, appropriate measures will be required to prevent, control, mitigate or offset the impacts or risks of development on community health and safety.*
>
> *ii. When the opportunity arises, particularly through development or redevelopment, remedial measures will be taken to address existing pollution or hazards which prejudice the health and safety of communities and their environments.*
>
> *iii. Development within the safeguarding area of a military explosives storage area or within the consultation zones of a hazardous industrial site or pipelines will be restricted or managed either in accordance with Health and Safety Executive guidelines, or in consultation with the Secretary of State for Defence, as applicable.*
>
> *iv. In the interests of public safety, vulnerable developments will not be permitted*
>
> *a. Within the defined Coastal Change Management Area at Barton-onSea to Milford-on-Sea unless in accordance with Saved Policy DM6: Coastal Change Management Areas;*
>
> *b. In areas at risk of flooding unless in accordance with the sequential and exceptions tests;*

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5 https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000

c. On contaminated, polluted or unstable land unless it is first adequately remediated or otherwise made safe for the proposed use and for the local community prior to occupation.

Sequential and Exception Tests

2.9. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test

2.10. The proposed development site is located in Flood Zone 1 and is therefore sequentially located with regards to fluvial and tidal flooding.

2.11. A sequential approach to surface water flooding has been proposed on site. All dwellings are to be sequentially located outside the 1:1000 year pluvial extent.

2.12. As such, a Sequential Test should not be required.

Exception Test

2.13. The Exception Test is applied to sites based on the Flood Zone and the nature of the development. As the proposed development consists of residential development buildings it would be classed as "More Vulnerable" in line with government development use classes.

2.14. The Flood Risk Vulnerability Classification table[6], provided below in Table 2 shows which vulnerabilities are appropriate in each Flood Zone.

2.15. The proposed development sits wholly within Flood Zone 1 and the proposed development is "More Vulnerable". Table 2 shows Flood Zone 1 is an appropriate location for "More Vulnerable" uses without the need for an Exception Test.

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6 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/575184/Table_3_-_Flood_risk_vulnerability_and_flood_zone__compatibility_.pdf

Table 2: Flood Risk Vulnerability Classification Table

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	x	Exception Test required	✓	✓
Zone 3b	Exception Test required	x	x	x	✓

Summary

2.16. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Consultation and Review

Sources of Information

Consultation

3.1. The site is within Flood Zone 1 and thus no data has been provided by the EA at the time of writing.

Documents

3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.

3.3. The following sources of information have been reviewed for this assessment:

- The Interactive Flood Risk Mapping available on the Environment Agency (EA) website[7].
- The National Planning Policy Framework (NPPF) technical guide (Communities and Local Government, 2019).
- British Geological Survey - Geology of Britain Viewer (British Geological Society, 2017).
- New Forest District Council Local Plan (2020).
- New Forest District Council Strategic Flood Risk Assessment[8] (SFRA) (2018).

7 Environment Agency, Flood Map for Planning, https://flood-map-for-planning.service.gov.uk/, 2017
8 https://www.newforest.gov.uk/article/2810/Strategic-Flood-Risk-Assessment

4. Sources of Flood Risk

Watercourses

4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.

Main Rivers

4.2. The nearest EA Main River to the site is the River Blackwater which is approximately 630m east of the site.

Ordinary Watercourses

4.3. There are several ordinary watercourse tributaries which flow into the River Blackwater, with the nearest approximately 300m southeast of the site.

4.4. A topographic survey provided by the client (Appendix A) indicates an existing ditch flowing west to east along part of the southern boundary of the site, before flowing into a pipe/ culvert and emerging as a ditch adjacent to the highway southeast of the site. It is unclear where this eventually discharges but it is flowing in the direction of the nearby ordinary watercourse tributaries of the River Blackwater.

4.5. The ditch is lower than most of the site. The risk from this source could be considered pluvial rather than fluvial and is discussed further below.

Fluvial and Tidal Flood Risk

4.6. The site is in Flood Zone 1 (Figure 3). Flood Zone 1 has a less than 1 in 1000 probability of annual fluvial and tidal flooding.

4.7. The nearest Flood Zone 2 and 3 extents are located approximately 285m east of the site, associated with the River Blackwater. Furthermore, the ground levels at the edge of the Flood Zone 2 and 3 extents are approximately 4m AOD based on 1m LiDAR.

4.8. The topographic survey indicates that ground levels on site vary between 20.24m Above Ordnance Datum (AOD) to 26.10m AOD.

4.9. The nearest EA Recorded Flood Outline to the site was resulting from a canal flood event, not fluvial – this was approximately 700m south of the site and is discussed further in the below sections.

4.10. As such, the site is significantly above the closest Flood Zone 2 and 3 extents and the risk of flooding from fluvial and tidal sources is considered low.

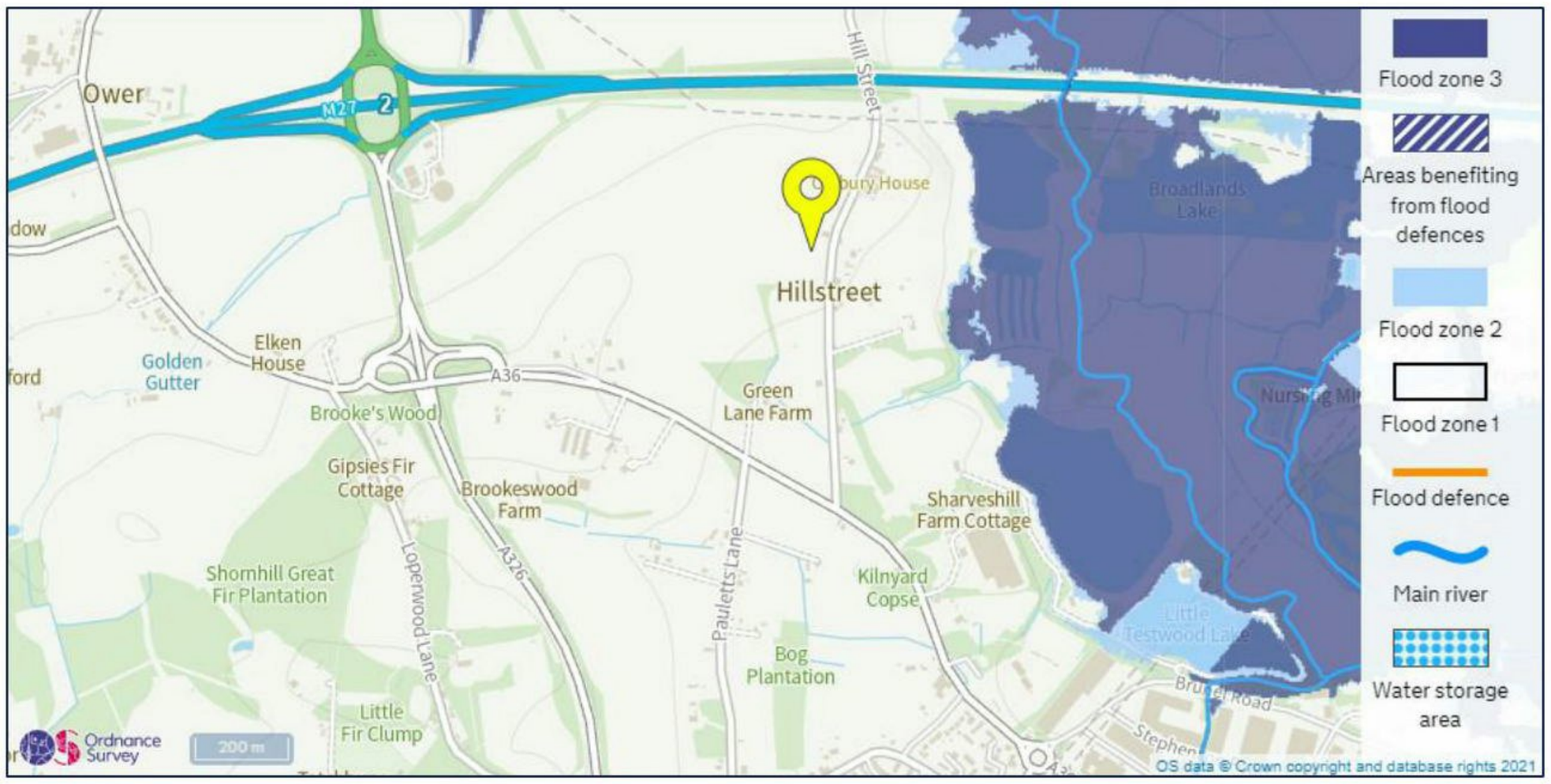


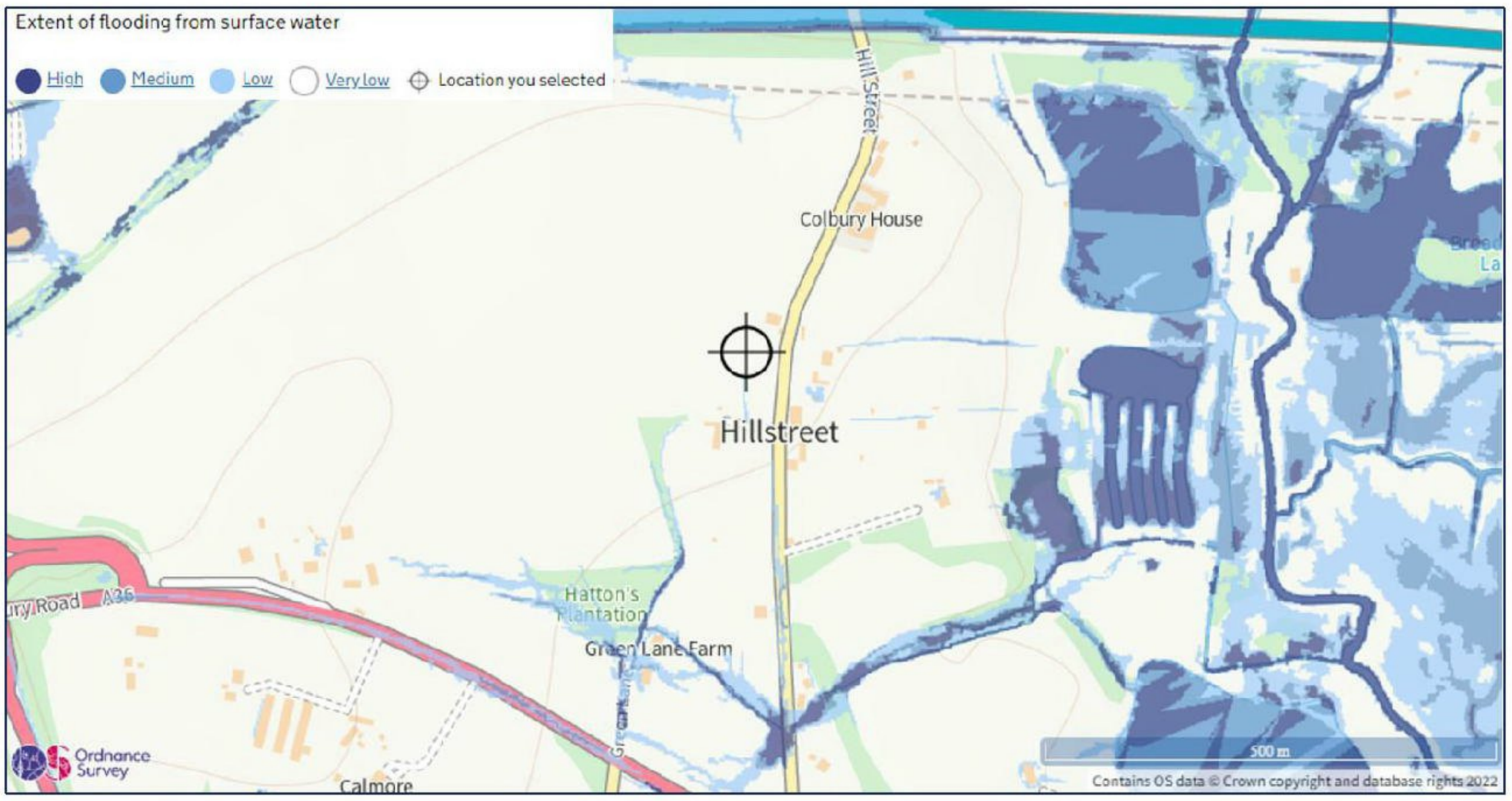
Figure 3: EA Flood Mapping for Planning

Canals

4.11. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders and boreholes and manages water levels by transferring it within the canal system.

4.12. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.

4.13. Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.



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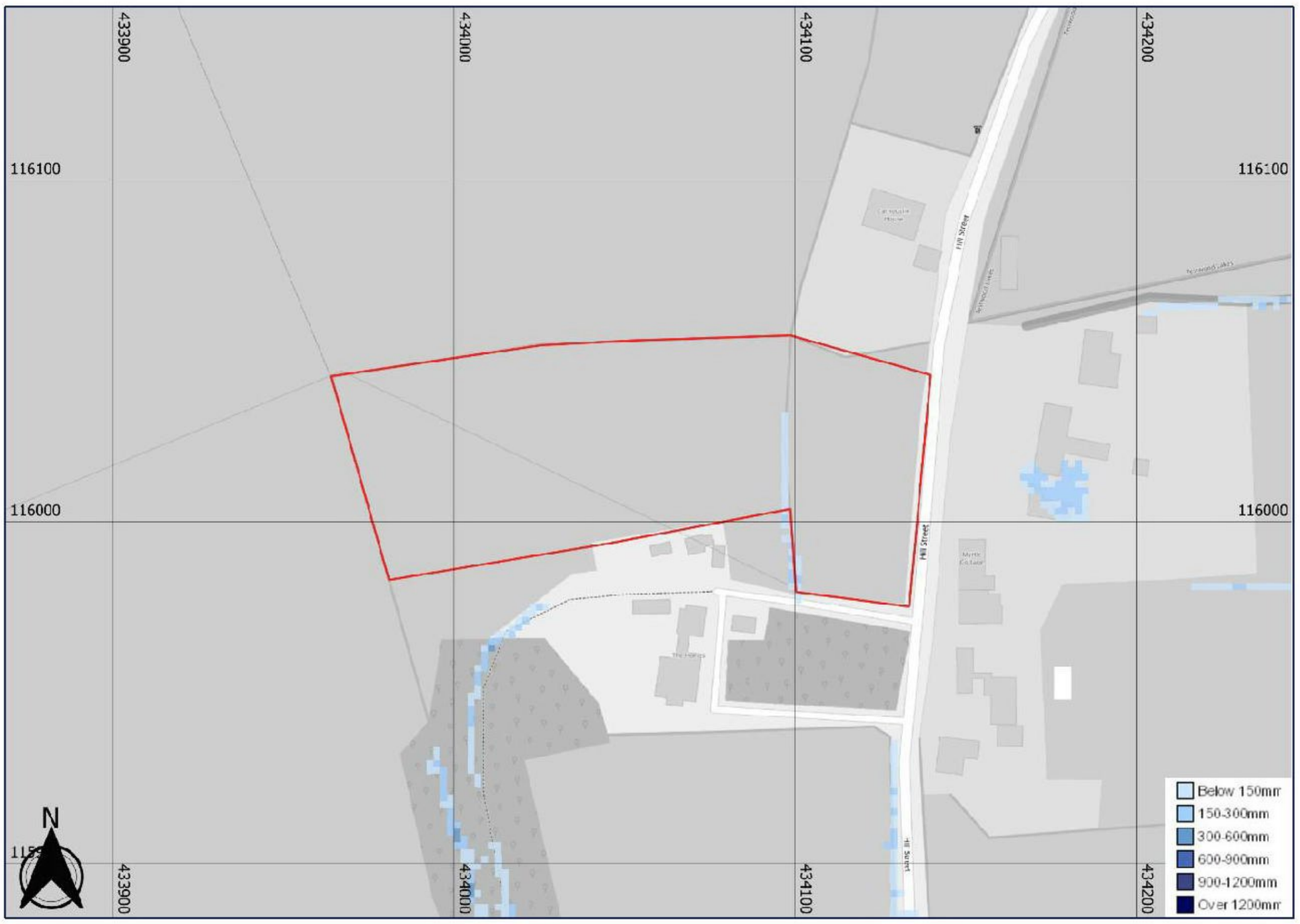

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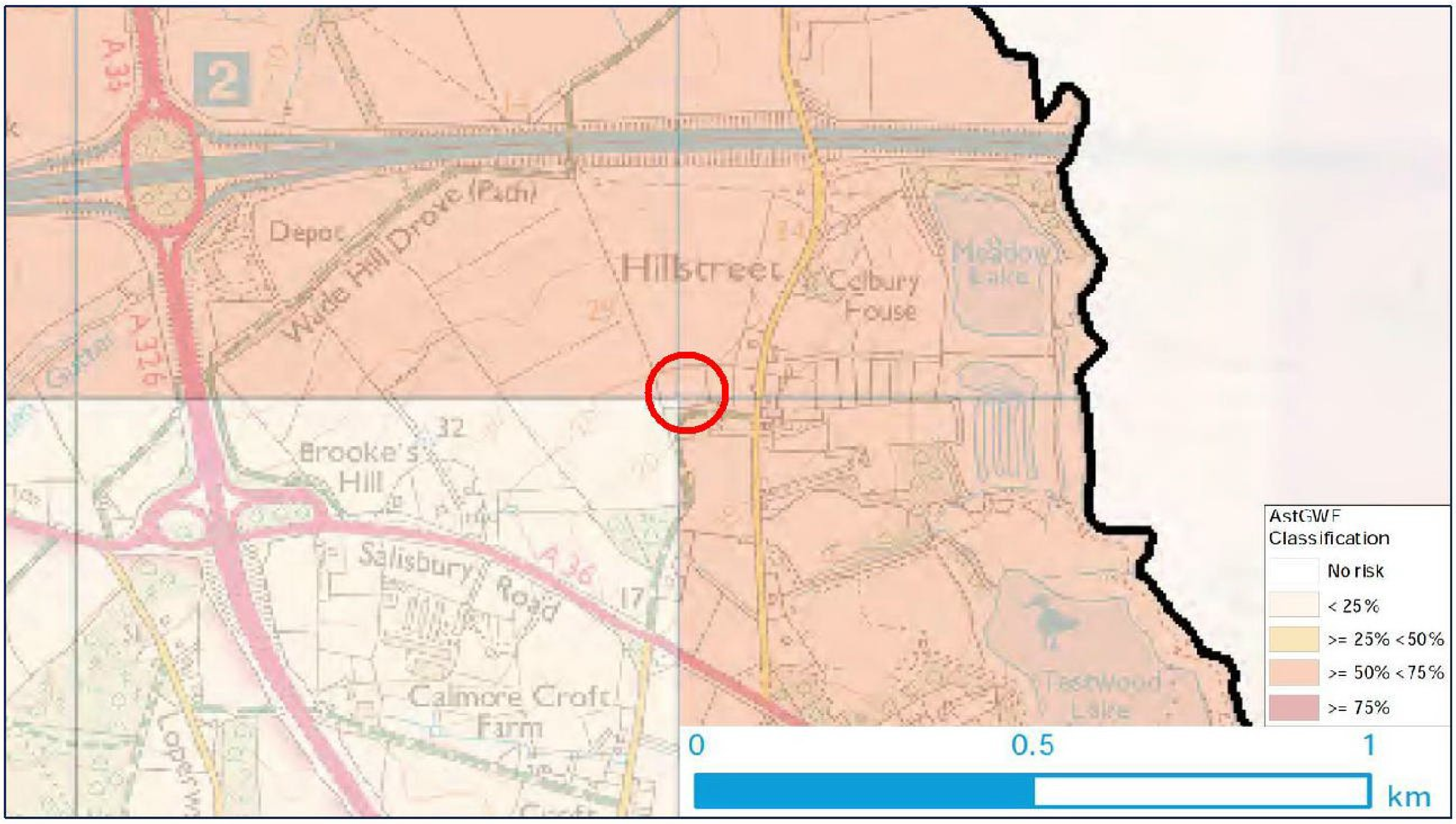

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5. Flood Risk Mitigation

Fluvial, Tidal and Canals

5.1. The risk of flooding from fluvial, tidal and canal sources is considered low and no specific mitigation measures are recommended.

Pluvial

5.2. Analysis within this report indicates that the majority of the site would remain unaffected in the modelled 1:1000 year event, with the affected area being within a retained vegetated area, which no dwellings are proposed to be situated.

5.3. The risk of flooding from pluvial sources is considered low and no specific mitigation measures are recommended.

Reservoirs, Groundwater and Sewers

5.4. Flood risk from reservoirs and sewer sources is considered low, and no specific mitigation measures are recommended.

5.5. The risk of flooding from groundwater is considered moderate. The proposed dwellings should be built in a flood proof manner at ground level to negate the risk of groundwater ingress.

EA Flood Warning Service

5.6. The site is in Flood Zone 1 and thus not within an EA Flood Warning Service Area.

Offsite Impacts

5.7. The proposed development site is in Flood Zone 1, and all dwellings are proposed outside the 1:1000 year pluvial flood extent. It is understood that no change to ground levels is proposed.

5.8. As such, the proposed development should not increase flood risk elsewhere through displacement of flood water.

6. Surface Water Drainage Strategy

Hampshire County Council – Sustainable Drainage Guidance for Developers

6.1. In April 2015 Hampshire County Council were made statutory consultees on the management of surface water and, as a result, will be required to provide technical advice on surface water drainage strategies and designs put forward for major development proposals.

6.2. Hampshire County Council's document titled "Surface Water and SuDS Drainage Guidance for Developers, Designers and Planners" provides guidance on what Hampshire County Council require developers to provide as part of a Surface Water Drainage Strategy.

Surrounding Water Environment & Existing Drainage

6.3. The Southern Water consultation response to Environmental Impact Assessment (EIA) Screening Opinion Application Ref 21/10379 (New Forest District Council) at a nearby site stated that there are no public foul and surface water sewers in the area to serve the development.

6.4. A topographic survey provided by the client (Appendix A) indicates and existing ditch flowing west to east along part of the southern boundary of the site, before flowing into a pipe/ culvert and emerging as a ditch adjacent to the highway southeast of the site. The topographic survey shows much of the site falling towards this ditch.

6.5. Infiltration has not been proposed at this stage. The reason for this is that the BGS Geology of Britain Viewer suggests a bedrock of the Wittering Formation comprised of sand, silt and clay with no superficial deposits. Infiltration tests have not been carried out on site, but they were carried out on the adjacent strategic site as part of the planning application for up to 300 homes. The soakage testing confirmed that the Wittering Formation was almost impervious. As such, infiltration has been discounted as part of this surface water drainage strategy.

Pre-Development / Greenfield Runoff Rates

6.6. The total area of the site is approximately 10,125m² (1.01 hectares).

6.7. Based on plans provided by the client, the proposed impermeable surface area on site totals 3,210m^2 (0.321 hectares).

6.8. The greenfield runoff rate for the site's total proposed hardstanding area of 3,210m^2 has been calculated using the IH-124 method (via the ICP SuDS variation) within InfoDrainage Software v2021.5.

6.9. The IH-124 method was developed as part of the original Flood Studies Report (FSR) in 1975 and was devised to calculate runoff from small catchments by estimating the mean annual flood flow (Qbar) using the following equation:

$$Qbar_{rural} = 0.00108(0.1 \times AREA)0.89 \times SAAR1.17 \times SPR2.17\ m^3/s$$

Where:

$Qbar_{rural}$ is the mean annual flood flow from a rural catchment (approximately 2.3 year return period).

AREA is the area of the hardstanding surfaces in ha.

SAAR is the Standard Average Annual Rainfall for the period 1941 to 1970 in mm

SPR is Standard Percentage Runoff coefficient for the SOIL category. The SOIL category is extracted from UK Winter Rainfall Acceptance Potential (WRAP) map.

6.10. The ICP SuDS variation is a scaled-down version of the IH-124 runoff method for estimating peak flow rates from both undeveloped and partly urbanised catchments that are smaller than 50 ha in size, which is appropriate in this instance.

6.11. The parameters used for estimating the greenfield runoff rates for the site are presented in Table 3.

Table 3 IH-124 Input Parameters

Greenfield runoff rates from the site – simulation criteria	
Rainfall Data	FSR
Area	0.321 Ha
SAAR	889.0
SOIL	0.15
Region	Region 7
Urban %	0

6.12. Table 4 displays the estimated greenfield runoff rates for the proposed impermeable area of 0.056 Ha.

Table 4 Greenfield Runoff Rates

Return Period	Greenfield Runoff Rate
1 in 1 Year	0.1 l/s
1 in 2 Year (Q_{BAR})	0.2 l/s
1 in 30 Year	0.4 l/s
1 in 100 Year	0.5 l/s

6.13. Standard S2 of the DEFRA Non-Statutory Technical Standards for Sustainable Drainage states:

> *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

6.14. As such, runoff rates from the proposed development should be restricted to greenfield rates for the same event, where possible. As greenfield rates are less than 1 l/s, restricting to these rates could result in an increased risk of blockage within the system. It is generally considered acceptable to restrict flows to 1 l/s when QBAR rates are below this.

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Surface Water Drainage Strategy

6.17. In accordance with the SuDS management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in detail for the development.

6.18. The management of surface water has been considered in respect to the SuDS hierarchy below, as detailed in the CIRIA 753 "The SuDS Manual" (section 3.2.3).

Table 5 SuDS Drainage Hierarchy

SUDS DRAINAGE HIERARCHY				
			Suitability	**Comment**
	1.	**Store rainwater for later use**	✓	Rainwater harvesting for the proposed dwellings should be considered by a specialist at the detailed design stage.
	2.	**Use infiltration techniques, such as porous surfaces in non-clay areas**	x	Given the mapped geology and ground conditions at both the site and the neighbouring areas, infiltration has been discounted until a site investigation is carried out. Prior to detailed design, a site investigation should be undertaken which includes groundwater monitoring and BRE365 infiltration testing. If the site investigation indicates that infiltration rates are good the strategy could be revised to show an infiltration (or partial infiltration) solution.
	3.	**Attenuate rainwater in ponds or open water features for gradual release**	x	The sloping topography of the site and proposed site layout limits the space available above ground SuDS.
	4.	**Attenuate rainwater by storing in tanks or sealed water features for gradual release**	✓	Attenuation can be provided in the form of a below ground geocellular crate system.
	5.	**Discharge rainwater direct to a watercourse**	✓	Proposed to discharge runoff to the ditch at the south of the site subject to approval from the LLFA.
	6.	**Discharge rainwater to a surface water sewer/drain**	x	No sewer in vicinity of site based on Southern Water asset plan
	7.	**Discharge rainwater to Combined Sewer**	x	No sewer in vicinity of site based on Southern Water asset plan

6.19. On review of the SuDS drainage hierarchy, and with reference to both national and local policy, surface water generated from the proposed development could be managed via **on site attenuation in the form of a series of cascading below ground geocellular tanks, with surface water discharging via two outfalls (both at a restricted rate of 1.0l/s) to ditch at the south of the site, subject to LLFA approval.**

InfoDrainage Modelling

6.20. A simplified surface water drainage model was built in InfoDrainage software (v 2021.7) which comprised of:

- 5 contributing catchment area across the proposed development area representing the proposed impermeable areas (roof areas, access road and parking)
- 5 attenuation tank units
- 1 Hydrobrake flow control, limited to 1.0 l/s (for Catchments B.1, B.2, C.1 and C.2).
- 1 pump manhole chamber, to pump flows from Catchment A.1 at 1.0 l/s into the ditch.

Table 6 Simulation Criteria

Total Catchment Area Simulation Parameters	
Rainfall Data	FSR
Area	0.321 Ha
M5-60	19.7mm
Ratio R	0.350
Return Periods	1, 30, 100, 100 +40% for Climate Change. Summer and Winter
Storm Durations	15, 30, 60, 120, 240, 360, 480, 960, 1140, 5760, 10080 minute
Volumetric Runoff Coefficient	0.90 (both summer and winter)
Percentage Impervious	100%
Time of Concentration	5 minutes

7. InfoDrainage Modelling Results

7.1. An InfoDrainage model has been produced with two separate flow paths. The western flow path captures inflows and runoff from Catchments C.1, C.2, B.1 and B.2; whereas the eastern flow path drains Catchment A.1 only.

7.2. The western flow path consists of four cascading below ground geocellular tanks to provide attenuation of runoff from Catchments C.1, C.2, B.1 and B.1 prior to discharging at 1 l/s via a Hydrobrake manhole into the existing ditch at the south of the site.

7.3. The eastern flow path consists of one inflow (Catchment A.1) only and a single geocellular crate system, prior to discharging into the ditch at the south of the site via a pump chamber at 1 l/s.

7.4. Figure 7 below provides an overview of the proposed InfoDrainage network model.

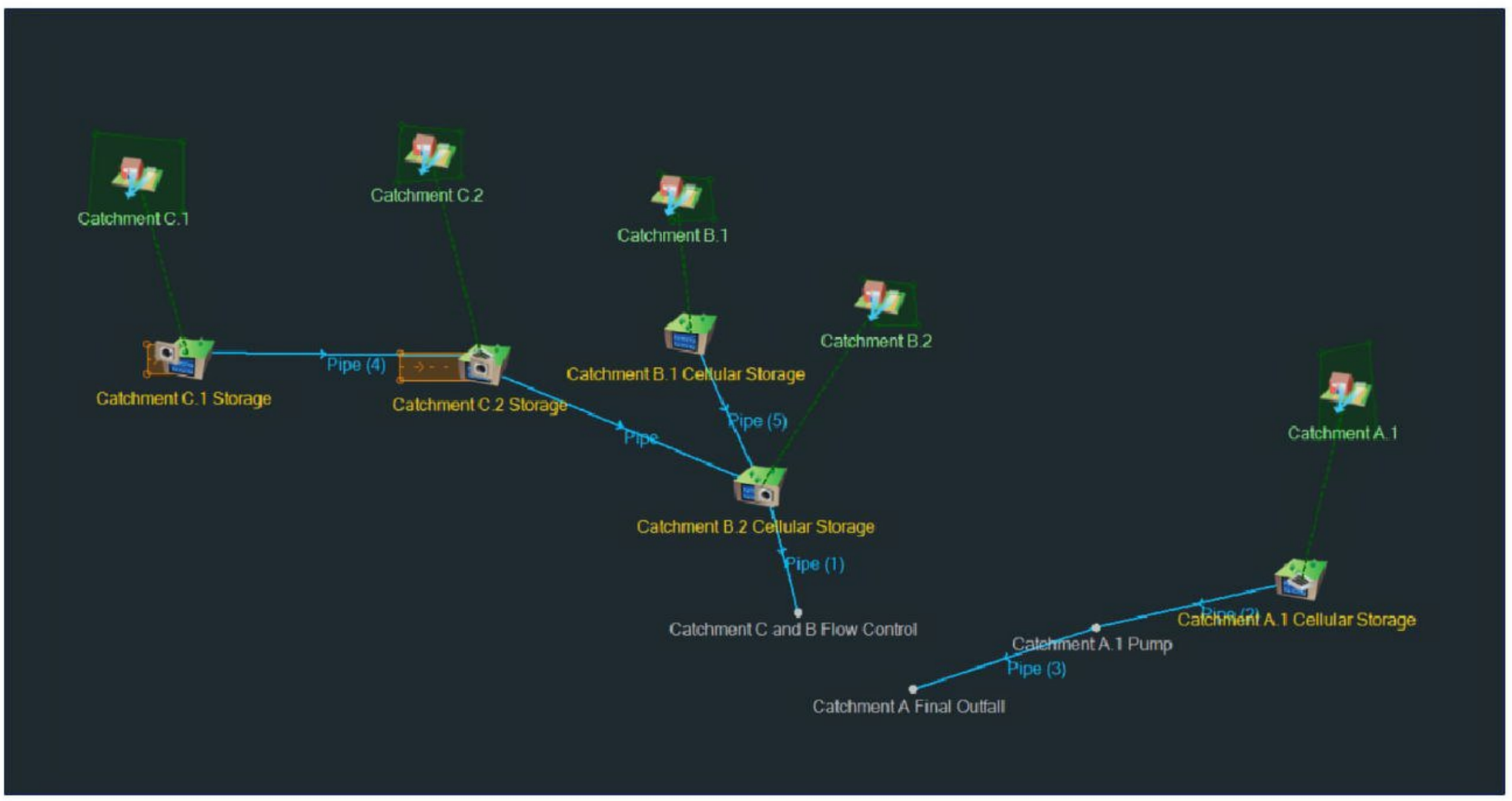


Figure 7 Schematic of InfoDrainage network

7.5. The full calculation outputs can be found in Appendix B of this report although the below sections summarise these outputs.

1 in 1 Year Storm Event

7.6. The results of the InfoDrainage simulations for the 1:1 year event are summarised in Table 7 below.

aegaea

Flood risk, water and environment

aegaea

Flood risk, water and environment

Maintenance

7.16. Table 11 presents details regarding the maintenance requirements for the proposed SuDS included as part of the development, taken from the CIRIA C753 SuDS manual. Each manufacturer will have bespoke requirements however the below should be used as a guide:

Table 11 Maintenance Requirements for Attenuation Tanks

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any area that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial Actions	Repair/ rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Surface Water Drainage Arrangement

7.17. The proposed outline surface water drainage layout can be found in Appendix C of this report.

Designing for Exceedance

7.18. Periods of exceedance occur when the rate of surface water runoff exceeds the drainage system capacity. Conveyance beneath ground cannot, generally, be economically or sustainably constructed to the scale required for the most extreme rainfall events. This may result, on occasion, in the surface water runoff exceeding the capacity of the drainage network, with excess water (exceedance flow) being conveyed above ground.

7.19. For situations where extreme rainfall intensity exceeds inlet capacities, or for extreme storm events exceeding the design flood event considered for drainage design, the proposed site levels should direct surface water to the soft landscaped areas and ditch, which should be below the floor level of the proposed dwellings.

Water Quality

7.20. In order to protect the downstream receiving water body, a key element of SuDS is that they have the potential to improve the quality of surface water discharged from a site. In order to assess this, the "Pollution hazard indices for different land use classifications", provided in the CIRIA SuDS Manual (C753) as table 26.2, has been reviewed. The indices use four different methods of assessing pollution potential based on the hazard level, total suspended solids (TSS), Metals, and Hydrocarbons.

7.21. The Pollution Hazard Indices are summarised in Table 12 below (with reference to table 26.3 in the CIRIA SuDS manual).

Table 12 Pollutant Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways	Low	0.5	0.4	0.4
Standard to be achieved	**Low**	**0.5**	**0.5**	**0.4**

7.22. Runoff from residential roofs is generally considered very low contamination risk and does not usually warrant any significant treatment. All downpipes should be fitted with silt traps to negate debris build up in the below ground network.

7.23. Runoff from individual property driveways is usually considered low contamination risk and can be treated through the provision of proprietary treatment products. Oil interceptors should be installed upstream of the geocellular tanks to negate oils entering the network.

8. Conclusions

8.1. This FRA and SWDS has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at Land North of The Hollies, Hill Street, Calmore, New Forest, SO40 2RX. It has been written to support a full planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.

8.2. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

Source of Flooding	Flood Risk Summary
Fluvial and Tidal	The EA Flood Map for Planning indicates that the site and proposed dwellings are sequentially located to Flood Zone 1. As such, the risk of flooding from fluvial sources is considered low.
Pluvial	The proposed dwellings would remain unaffected in the 1:1000 year event based on the RoFSW dataset and therefore the risk is considered low.
Reservoirs Groundwater Sewers	Flood risk from reservoirs and sewer sources is considered low, and no specific mitigation measures are recommended. The risk of flooding from groundwater is considered moderate. The proposed dwellings should be built in a flood proof manner (i.e solid concrete floors) at ground level to negate the risk of groundwater ingress.

8.3. Standard S2 of the DEFRA Non-Statutory Technical Standards for Sustainable Drainage states:

> *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

8.4. As such, runoff rates from the proposed development should be restricted to greenfield rates for the same event, where possible. As greenfield rates are less than 1 l/s, restricting to these rates could result in an increased risk of blockage within the system. It is generally considered acceptable to restrict flows to 1 l/s when QBAR rates are below this.

8.5. However, given the topography of the site, the site has been split with two outfalls into the ditch. Catchment A.1 drains into the ditch from the lowest part of the site, requiring a pump to lift runoff from the geocellular storage into the outfall (pump rate of 1 l/s). Catchments B.1, B.2, C.1 and C.2 all drain via the same outfall through a Hydrobrake manhole with runoff rates restricted to 1 l/s.

8.6. Therefore, the total proposed runoff rates into the ditch would be 2 l/s in the 1:100 year +CC (40%) event. This is greater than the Q_{BAR} rate for the equivalent hardstanding area however this has been proposed due to the need for two outfalls, and a rate lower than 1 l/s in either network could increase the chance of blockage in the system - hence 1 l/s has been proposed for each outfall.

8.7. On review of the SuDS drainage hierarchy, and with reference to both national and local policy, surface water generated from the proposed development could be managed via **on site attenuation in the form of a series of cascading below ground geocellular tanks, with surface water discharging via two outfalls (both at a restricted rate of 1.0l/s) to ditch at the south of the site, subject to LLFA approval.**

8.8. This report should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals

BLOCK PLAN

Revision

SCHEME SCHEDULE:

PLOTS	1 & 2	(2 Beds)	70.68m2
PLOTS	3	(3 Beds)	82.82m2
PLOTS	4 & 5	(3 Beds)	90.16m2
PLOT	6	(4 Beds)	134.70m2
PLOT	7	(4 Beds)	144.40m2
PLOT	8	(4 Beds)	152.90m2
PLOT	9	(4 Beds)	156.10m2

Overall site m2 = 1000m2.

N

0 20 40 60 80 M

Notes

1. Electric 5 bar gate, supported on Oak posts - see drawing 222
2. Open sided car barns see drawing 119.
3. Lockable cycle store for 4 bikes bin store for land and recycling bins. See drawing 220.
4. Potential future link to wider allocation.
5. Alternative Natural Recreational Greenspace area indicated at .27ha.
6. Link to an existing public footpath.
7. Potential to increase the existing boundary hedging with additional native hedging.

LAND NORTH OF THE HOLLIES

clients details
OSMAN HOMES LTD.

site details
Land North of The Hollies,
Hill Street,
Calmore. SO40 2RX

drawing reference
BLOCK PLAN

created by	drawing No	Revision	date
HDC Ltd	225/DP/200		Mar 22
scale 1:500@A3	stage: planning		

www.hampshiredesign.co.uk

Co-ordinate Schedule: 0706.1

Station	Easting	Northing	Height	Remarks
ADS12152	434130.1397	115944.3444	19.3699	PEG/HILTI
ADS12227	434145.6516	116050.2606	22.5230	PK SURVEY NAIL
ADS12228	434154.3839	116108.5008	23.8986	PK SURVEY NAIL

Metres

DATE	DETAILS	
10/02/21	ORIGINAL ISSUE	
	SURVEYED AND PROCESSED BY: ADS	DRAWN BY: JM

NOTES

ADS Surveys Ltd. Own the copyright of this drawing. Their written consent must be obtained before this drawing is copied, forwarded to any third parties, or used for any purpose other than the one for which it was supplied.

This survey has been carried out to an accuracy consistent with a presentation scale of 1:200; therefore interrogated dimensions will be within the tolerance associated with this scale. The same accuracies implied by the plotting scale are equally applicable to digital data supplied for CAD. The scale of this drawing should not be changed without permission.

Boundaries shown are not necessarily legal boundaries.

Building footprints edged with a solid line have been surveyed. Where the outline is merely hatched the footprint is indicative only.

All levels, heights, measurements and dimensions are in metres unless otherwise stated.

Eaves levels are generally surveyed as the end of the roof slate/tile/thatch. In cases where this is not possible the top of gutter is surveyed instead. Where underside of fascia or other features are surveyed these are recorded as such.

All below-ground features (including drainage, voids and services) have been identified from above ground and therefore all details relating to these (such as sizes, depth, pipe positions and alignments, description etc.) will be approximate only.

Underground services have not been traced, but any visible surface features have been located. No allowance has been made for any sub-surface manholes or other chambers or voids below ground level. While every effort is made to identify all visible above-ground features, it should be noted that there may be features obscured at the time of survey.

Spot heights at edges of roads are road/gutter levels, not top of kerb unless otherwise stated.

Trees have been drawn diagrammatically (i.e. Circular) showing average canopy spread, however their true shape in plan will be different.

All heights within the drawing relate to OS datum (AOD) unless specified otherwise.

Measurements to internal walls have been taken to the wall finishes at approximately 1m above floor level and assumed to be vertical.

LEGEND

LEGEND:

ACU	Air-Conditioning Unit
AHt	Arch Head Height
AV	Air Vent
BB	Belisha Beacon
BOL	Bollard
CATV	Cable TV Cover
CCTV	CCTV Security Camera
CH	CH to Head Level
CL	Cover Level
CLG	Ceiling Height
CNC	Concrete
DK	Drop Kerb
DPC	Damp Proof Course
EP	Electricity Pole
ER	Earthing Rod
FB	Flower Bed
FC	Floor to CH Level
FFL	Finished Floor Level
FH	Fire Hydrant
FL	Flood Light
FS	Flagstaff
GL	Ground Level
GP	Gate Post
GV	Gas Valve
GY	Gully
IC	Inspection Cover
ICBT	BT Cover
IC-E	Electricity Cover
IC-G	Gas Cover
IC-TL	Traffic Light Cover
ICW	Water Cover
IL	Invert Level
LP	Lamp Post
MH	Manhole
MHFW	Manhole - Foul Water
MHSW	Manhole : Surface Water
MP	Marker Post
MS	Mile Stone

OSBM	OS Bench Mark
RE	Reading Eye
RS	Road Sign
RWP	Rainwater Pipe
SC	Stop Cock
SP	Sign Post
SPrH	Spring Point of Arch
SV	Stop Valve
SVP	Soil & Vent Pipe
Thr	Threshold Level
TL	Traffic Lights
ToF	Top of Fence
ToFJ	Top of Floor Joists
ToH	Top of Hedge
ToW	Top of Wall
ToWP	Top of Wallplate
TP	Telegraph Pole
TrHt	Tree Height
TS	Tree Stump
UNK	Unknown Species
uoB	Under-side of Beam
uoC	Under-side of Cill
uoCol	Under-side of Collar
uoDH	Under-side of Doorhead
uoF	Under-side of Fascia
uoFB	Under-side of floorboards
uoJ	Under-side of Joists
uoP	Under-side of Purlin
uoR	Under-side of Ridge
uoRB	Under-side of Ridgeboard
uoRSJ	Under-side of Rolled-Steel Joist
uoT	Under-side of Truss
uoWH	Under-side of Windowhead
uoWP	Under-side of Wallplate
UTL	Unable to lift
WM	Water Meter
WP	Waste Pipe
WV	Water Valve

Fences:

AIF	Angle Iron Fence
BWF	Barbed Wire Fence
CBF	Close Boarded Fence
CIF	Corrugated Iron Fence
CLF	Chain Link Fence
IR	Iron Railings
LLF	Larch Lap Fence
OBF	Open Boarded Fence
P&R	Post & Rail Fence
P&Ro	Post & Roll Fence
P&W	Post & Wire Fence
RW	Retaining Wall
(CP/SP/TP)	(Concrete Post/Steel Post/Timber Post)

Features:

Overhead Wire

Drainage information (pipe diameter & flow direction)

Trees

CLIENT

OSMAN HOMES

DRAWING TITLE

TOPOGRAPHICAL SURVEY

PROJECT

LAND TO NORTH OF HOLLIES
HILL STREET
CALMORE

ADS Surveys Ltd
Andell House
Highfield Lane
Woodfalls, Wiltshire
SP5 2NG
Tel: 07738 462205
Email: andy@ads-surveys.uk

The horizontal & vertical control of this survey is based on Ordnance Survey grid as translated from GPS co-ordinates using the OSTN02 & OSGM02 transformation as supplied by OS.
We have applied a reverse scale factor to maintain true ground distances. Vertical values may differ from existing OS benchmarks in the vicinity which should be disregarded. All levels should be taken from ADS survey control.

Scale:	REV.	Drawing No:
1:500	-	ADS/0706.1-TP1
Plotted on A1		

Appendix B – InfoDrainage Calculations

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		

Catchment C.2

Type : Catchment Area

Area (ha)	0.045

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment B.2

Type : Catchment Area

Area (ha)	0.028

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment A.1

Type : Catchment Area

Area (ha)	0.067

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		

Catchment C.1

Type : Catchment Area

Area (ha)	0.103

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Catchment B.1

Type : Catchment Area

Area (ha)	0.078

Preliminary Sizing

Volumetric Runoff Coefficient	0.900
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.900
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
Catchment A Final Outfall	Manhole	208640.876	601469.978	22.000	0.500
Catchment C and B Flow Control	Manhole	208598.185	601498.438	22.400	0.500
Catchment A.1 Pump	Manhole	208709.285	601492.948	21.350	2.200

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
Catchment A Final Outfall	21.500	Circular	1.000	☐
Catchment C and B Flow Control	21.900	Circular	1.200	☐
Catchment A.1 Pump	19.150	Circular	1.200	☐

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Catchment C.2 Storage

Type : Cellular Storage

Dimensions

Exceedence Level (m)	23.600
Depth (m)	0.400
Base Level (m)	22.100
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	34
Crate Width (m)	10
Crate Height (m)	0.4
Total Volume (m³)	130.300

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment C.2 Pipe (4)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Orifice

Diameter (m)	0.027
Coefficient of Discharge	0.600
Invert Level (m)	22.100

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Catchment B.2 Cellular Storage

Type : Cellular Storage

Dimensions

Exceedence Level (m)	23.000
Depth (m)	0.400
Base Level (m)	22.000
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	8
Crate Width (m)	8
Crate Height (m)	0.4
Total Volume (m³)	24.920

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe Catchment B.2 Pipe (5)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Orifice
Diameter (m)	0.027
Coefficient of Discharge	0.600
Invert Level (m)	22.000

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Catchment A.1 Cellular Storage

Type : Cellular Storage

Dimensions

Exceedence Level (m)	21.100
Depth (m)	1.200
Base Level (m)	19.300
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	6
Crate Width (m)	6
Crate Height (m)	1.2
Total Volume (m³)	41.640

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment A.1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (2)
Outlet Type	Free Discharge

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Catchment C.1 Storage

Type : Cellular Storage

Dimensions

Exceedence Level (m)	25.000
Depth (m)	0.400
Base Level (m)	24.000
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	18
Crate Width (m)	11
Crate Height (m)	0.4
Total Volume (m³)	75.840

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment C.1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (4)
Outlet Type	Orifice

Diameter (m)	0.034
Coefficient of Discharge	0.600
Invert Level (m)	24.000

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Catchment B.1 Cellular Storage

Type : Cellular Storage

Dimensions

Exceedence Level (m)	23.000
Depth (m)	0.400
Base Level (m)	22.000
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	13.4
Crate Width (m)	10
Crate Height (m)	0.4
Total Volume (m³)	51.520

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment B.1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Orifice

Diameter (m)	0.027
Coefficient of Discharge	0.600
Invert Level (m)	22.000

Outlet (1)

Outgoing Connection	Pipe (5)
Outlet Type	Free Discharge

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Title: UK and Ireland Rural Runoff Calculator	Company Address:		

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.321
SAAR (mm)	889.0
Soil	0.15
Region	Region 7
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 7	0.2	0.2	0.1	0.4	0.5

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m^3)
Catchment C.2	FSR: 1 years: +0 %: 15 mins: Summer	0.05	7.4	3.257
Catchment B.2	FSR: 1 years: +0 %: 15 mins: Summer	0.03	4.6	2.037
Catchment A.1	FSR: 1 years: +0 %: 15 mins: Summer	0.07	11.0	4.840
Catchment C.1	FSR: 1 years: +0 %: 15 mins: Summer	0.10	16.9	7.411
Catchment B.1	FSR: 1 years: +0 %: 15 mins: Summer	0.08	12.9	5.635

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m³)
Catchment C.2	FSR: 30 years: +0 %: 15 mins: Summer	0.05	18.2	7.974
Catchment B.2	FSR: 30 years: +0 %: 15 mins: Summer	0.03	11.4	4.986
Catchment A.1	FSR: 30 years: +0 %: 15 mins: Summer	0.07	27.1	11.848
Catchment C.1	FSR: 30 years: +0 %: 15 mins: Summer	0.10	41.4	18.143
Catchment B.1	FSR: 30 years: +0 %: 15 mins: Summer	0.08	31.5	13.791

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m^3)
Catchment C.2	FSR: 100 years: +0 %: 15 mins: Summer	0.05	23.6	10.327
Catchment B.2	FSR: 100 years: +0 %: 15 mins: Summer	0.03	14.8	6.458
Catchment A.1	FSR: 100 years: +0 %: 15 mins: Summer	0.07	35.1	15.345
Catchment C.1	FSR: 100 years: +0 %: 15 mins: Summer	0.10	53.7	23.496
Catchment B.1	FSR: 100 years: +0 %: 15 mins: Summer	0.08	40.8	17.862

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m³)
Catchment C.2	FSR: 100 years: +40 %: 15 mins: Summer	0.05	33.0	14.466
Catchment B.2	FSR: 100 years: +40 %: 15 mins: Summer	0.03	20.7	9.045
Catchment A.1	FSR: 100 years: +40 %: 15 mins: Summer	0.07	49.1	21.491
Catchment C.1	FSR: 100 years: +40 %: 15 mins: Summer	0.10	75.2	32.907
Catchment B.1	FSR: 100 years: +40 %: 15 mins: Summer	0.08	57.1	25.017

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Catchment A Final Outfall	FSR: 1 years: +0 %: 15 mins: Summer	22.000	21.500	21.500	0.000	1.0	0.000	0.000	1.0	1.156	OK
Catchment C and B Flow Control	FSR: 1 years: +0 %: 960 mins: Summer	22.400	21.900	21.940	0.040	0.4	0.045	0.000	0.4	27.755	OK
Catchment A.1 Pump	FSR: 1 years: +0 %: 120 mins: Summer	21.350	19.150	19.427	0.277	4.1	0.313	0.000	1.0	10.323	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Catchment A Final Outfall	FSR: 30 years: +0 %: 15 mins: Summer	22.000	21.500	21.500	0.000	1.0	0.000	0.000	1.0	1.296	OK
Catchment C and B Flow Control	FSR: 30 years: +0 %: 960 mins: Summer	22.400	21.900	21.958	0.058	0.6	0.065	0.000	0.6	47.568	OK
Catchment A.1 Pump	FSR: 30 years: +0 %: 120 mins: Summer	21.350	19.150	19.775	0.625	3.1	0.707	0.000	1.0	12.941	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Catchment A Final Outfall	FSR: 100 years: +0 %: 15 mins: Summer	22.000	21.500	21.500	0.000	1.0	0.000	0.000	1.0	1.331	OK
Catchment C and B Flow Control	FSR: 100 years: +0 %: 480 mins: Summer	22.400	21.900	21.966	0.066	0.7	0.074	0.000	0.7	29.695	OK
Catchment A.1 Pump	FSR: 100 years: +0 %: 240 mins: Summer	21.350	19.150	19.989	0.839	2.0	0.949	0.000	1.0	26.846	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Catchment A Final Outfall	FSR: 100 years: +40 %: 15 mins: Summer	22.000	21.500	21.500	0.000	1.0	0.000	0.000	1.0	1.375	OK
Catchment C and B Flow Control	FSR: 100 years: +40 %: 480 mins: Summer	22.400	21.900	21.983	0.083	0.9	0.094	0.000	0.9	36.230	OK
Catchment A.1 Pump	FSR: 100 years: +40 %: 240 mins: Summer	21.350	19.150	20.412	1.262	1.8	1.428	0.000	1.0	27.347	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Catchment C.2 Storage	FSR: 1 years: +0 %: 1440 mins: Summer	22.188	22.188	0.088	0.088	1.3	28.335	0.000	0.000	0.4	41.185	763	78	OK
Catchment B.2 Cellular Storage	FSR: 1 years: +0 %: 960 mins: Summer	22.095	22.095	0.095	0.095	0.9	5.783	0.000	0.000	0.4	36.360	141	77	OK
Catchment A.1 Cellular Storage	FSR: 1 years: +0 %: 120 mins: Summer	19.427	19.427	0.127	0.127	5.5	4.344	0.000	0.000	4.1	10.400	8	90	OK
Catchment C.1 Storage	FSR: 1 years: +0 %: 960 mins: Summer	24.091	24.091	0.091	0.091	2.2	17.181	0.000	0.000	0.7	30.132	268	77	OK
Catchment B.1 Cellular Storage	FSR: 1 years: +0 %: 960 mins: Summer	22.095	22.095	0.095	0.095	1.6	12.107	0.000	0.000	0.5	29.820	225	77	OK

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Catchment C.2 Storage	FSR: 30 years: +0 %: 1440 mins: Summer	22.292	22.292	0.192	0.192	2.3	62.131	0.000	0.000	0.6	68.331	1260	52	OK
Catchment B.2 Cellular Storage	FSR: 30 years: +0 %: 960 mins: Summer	22.200	22.200	0.200	0.200	1.7	12.166	0.000	0.000	0.6	61.913	192	51	OK
Catchment A.1 Cellular Storage	FSR: 30 years: +0 %: 120 mins: Summer	19.775	19.775	0.475	0.475	12.8	16.259	0.000	0.000	3.1	15.410	60	61	OK
Catchment C.1 Storage	FSR: 30 years: +0 %: 480 mins: Summer	24.205	24.205	0.205	0.205	7.5	38.572	0.000	0.000	1.0	41.098	369	49	OK
Catchment B.1 Cellular Storage	FSR: 30 years: +0 %: 960 mins: Summer	22.201	22.201	0.201	0.201	3.4	25.535	0.000	0.000	1.0	55.332	263	50	OK

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Catchment C.2 Storage	FSR: 100 years: +0 %: 1440 mins: Summer	22.354	22.354	0.254	0.254	2.8	82.098	0.000	0.000	0.7	76.764	1870	37	OK
Catchment B.2 Cellular Storage	FSR: 100 years: +0 %: 480 mins: Summer	22.249	22.249	0.249	0.249	3.4	15.124	0.000	0.000	0.7	37.848	212	39	OK
Catchment A.1 Cellular Storage	FSR: 100 years: +0 %: 240 mins: Summer	19.989	19.989	0.689	0.689	10.5	23.570	0.000	0.000	2.0	29.317	119	43	OK
Catchment C.1 Storage	FSR: 100 years: +0 %: 480 mins: Summer	24.270	24.270	0.270	0.270	9.6	50.784	0.000	0.000	1.2	49.321	418	33	OK
Catchment B.1 Cellular Storage	FSR: 100 years: +0 %: 480 mins: Summer	22.256	22.256	0.256	0.256	7.3	32.541	0.000	0.000	1.6	41.141	214	37	OK

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Catchment C.2 Storage	FSR: 100 years: +40 %: 1440 mins: Summer	22.478	22.478	0.378	0.378	3.9	122.166	0.000	0.000	0.8	88.987	3560	6	OK
Catchment B.2 Cellular Storage	FSR: 100 years: +40 %: 480 mins: Summer	22.355	22.355	0.355	0.355	4.9	21.558	0.000	0.000	0.9	47.372	249	13	OK
Catchment A.1 Cellular Storage	FSR: 100 years: +40 %: 240 mins: Summer	20.413	20.413	1.113	1.113	14.7	38.048	0.000	0.000	1.8	30.346	194	9	OK
Catchment C.1 Storage	FSR: 100 years: +40 %: 480 mins: Summer	24.391	24.391	0.391	0.391	13.5	73.459	0.000	0.000	1.5	61.997	499	3	OK
Catchment B.1 Cellular Storage	FSR: 100 years: +40 %: 480 mins: Summer	22.366	22.366	0.366	0.366	10.3	46.623	0.000	0.000	2.1	54.249	219	10	OK

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 1 years: +0 %: 1440 mins: Summer	Pipe	Catchment C.2 Storage	Catchment B.2 Cellular Storage	23.6	22.188	0.058	41.079	0.1	0.02	0.4	OK
Pipe (1)	FSR: 1 years: +0 %: 960 mins: Summer	Pipe	Catchment B.2 Cellular Storage	Catchment C and B Flow Control	23.0	22.095	0.030	27.834	0.1	0.02	0.4	OK
Pipe (2)	FSR: 1 years: +0 %: 30 mins: Summer	Pipe	Catchment A.1 Cellular Storage	Catchment A.1 Pump	21.1	19.398	0.173	4.452	0.4	0.32	7.2	OK
Pipe (3)	FSR: 1 years: +0 %: 15 mins: Summer	Pipe	Catchment A.1 Pump	Catchment A Final Outfall	21.4	19.385	0.014	1.156	0.0	0.03	1.0	Surcharged
Pipe (4)	FSR: 1 years: +0 %: 960 mins: Summer	Pipe	Catchment C.1 Storage	Catchment C.2 Storage	25.0	24.091	0.046	30.147	0.3	0.01	0.7	OK
Pipe (5)	FSR: 1 years: +0 %: 120 mins: Summer	Pipe	Catchment B.1 Cellular Storage	Catchment B.2 Cellular Storage	23.0	22.076	0.076	1.168	0.1	0.09	0.5	OK

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 30 years: +0 %: 1440 mins: Summer	Pipe	Catchment C.2 Storage	Catchment B.2 Cellular Storage	23.6	22.292	0.147	68.150	0.1	0.04	0.6	OK
Pipe (1)	FSR: 30 years: +0 %: 960 mins: Summer	Pipe	Catchment B.2 Cellular Storage	Catchment C and B Flow Control	23.0	22.200	0.041	47.693	0.1	0.03	0.6	OK
Pipe (2)	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	Catchment A.1 Cellular Storage	Catchment A.1 Pump	21.1	19.559	0.225	3.558	0.6	0.72	16.1	Surcharged
Pipe (3)	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	Catchment A.1 Pump	Catchment A Final Outfall	21.4	19.559	0.014	1.296	0.0	0.03	1.0	Surcharged
Pipe (4)	FSR: 30 years: +0 %: 480 mins: Summer	Pipe	Catchment C.1 Storage	Catchment C.2 Storage	25.0	24.205	0.084	41.039	0.4	0.02	1.0	OK
Pipe (5)	FSR: 30 years: +0 %: 30 mins: Summer	Pipe	Catchment B.1 Cellular Storage	Catchment B.2 Cellular Storage	23.0	22.131	0.100	1.640	0.1	0.19	1.1	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item

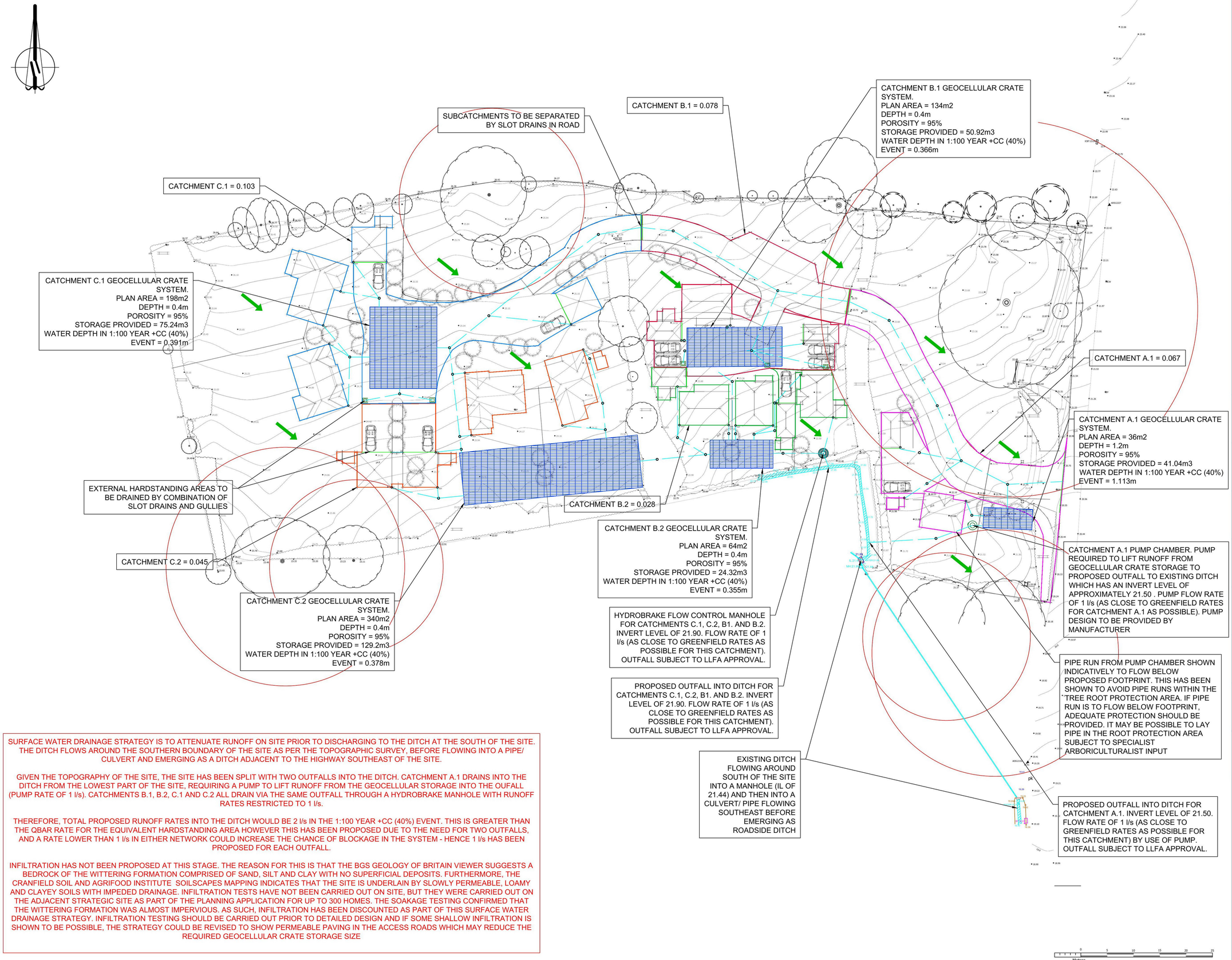
Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 100 years: +0 %: 1440 mins: Summer	Pipe	Catchment C.2 Storage	Catchment B.2 Cellular Storage	23.6	22.354	0.197	76.553	0.1	0.05	0.7	Surcharged
Pipe (1)	FSR: 100 years: +0 %: 480 mins: Summer	Pipe	Catchment B.2 Cellular Storage	Catchment C and B Flow Control	23.0	22.249	0.046	29.879	0.2	0.03	0.7	Surcharged
Pipe (2)	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	Catchment A.1 Cellular Storage	Catchment A.1 Pump	21.1	19.659	0.225	3.607	0.6	0.81	18.3	Surcharged
Pipe (3)	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	Catchment A.1 Pump	Catchment A Final Outfall	21.4	19.659	0.014	1.331	0.0	0.03	1.0	Surcharged
Pipe (4)	FSR: 100 years: +0 %: 480 mins: Summer	Pipe	Catchment C.1 Storage	Catchment C.2 Storage	25.0	24.270	0.111	49.246	0.4	0.02	1.2	Surcharged
Pipe (5)	FSR: 100 years: +0 %: 60 mins: Summer	Pipe	Catchment B.1 Cellular Storage	Catchment B.2 Cellular Storage	23.0	22.209	0.100	4.498	0.2	0.23	1.4	Surcharged

Project:	Date: 05/04/2022		
	Designed by: chris	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 100 years: +40 %: 1440 mins: Summer	Pipe	Catchment C.2 Storage	Catchment B.2 Cellular Storage	23.6	22.478	0.225	85.922	0.1	0.06	0.9	Surcharged
Pipe (1)	FSR: 100 years: +40 %: 480 mins: Summer	Pipe	Catchment B.2 Cellular Storage	Catchment C and B Flow Control	23.0	22.355	0.056	36.468	0.2	0.04	0.9	Surcharged
Pipe (2)	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	Catchment A.1 Cellular Storage	Catchment A.1 Pump	21.1	19.833	0.225	3.791	0.6	0.86	19.2	Surcharged
Pipe (3)	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	Catchment A.1 Pump	Catchment A Final Outfall	21.4	19.833	0.014	1.375	0.0	0.03	1.0	Surcharged
Pipe (4)	FSR: 100 years: +40 %: 480 mins: Summer	Pipe	Catchment C.1 Storage	Catchment C.2 Storage	25.0	24.391	0.157	61.896	0.4	0.02	1.5	Surcharged
Pipe (5)	FSR: 100 years: +40 %: 60 mins: Summer	Pipe	Catchment B.1 Cellular Storage	Catchment B.2 Cellular Storage	23.0	22.296	0.100	6.684	0.2	0.31	1.8	Surcharged

Appendix C – Surface Water Drainage Layout



SURFACE WATER DRAINAGE STRATEGY IS TO ATTENUATE RUNOFF ON SITE PRIOR TO DISCHARGING TO THE DITCH AT THE SOUTH OF THE SITE. THE DITCH FLOWS AROUND THE SOUTHERN BOUNDARY OF THE SITE AS PER THE TOPOGRAPHIC SURVEY, BEFORE FLOWING INTO A PIPE/ CULVERT AND EMERGING AS A DITCH ADJACENT TO THE HIGHWAY SOUTHEAST OF THE SITE.

GIVEN THE TOPOGRAPHY OF THE SITE, THE SITE HAS BEEN SPLIT WITH TWO OUTFALLS INTO THE DITCH. CATCHMENT A.1 DRAINS INTO THE DITCH FROM THE LOWEST PART OF THE SITE, REQUIRING A PUMP TO LIFT RUNOFF FROM THE GEOCELLULAR STORAGE INTO THE OUFALL (PUMP RATE OF 1 l/s). CATCHMENTS B.1, B.2, C.1 AND C.2 ALL DRAIN VIA THE SAME OUTFALL THROUGH A HYDROBRAKE MANHOLE WITH RUNOFF RATES RESTRICTED TO 1 l/s.

THEREFORE, TOTAL PROPOSED RUNOFF RATES INTO THE DITCH WOULD BE 2 l/s IN THE 1:100 YEAR +CC (40%) EVENT. THIS IS GREATER THAN THE QBAR RATE FOR THE EQUIVALENT HARDSTANDING AREA HOWEVER THIS HAS BEEN PROPOSED DUE TO THE NEED FOR TWO OUTFALLS, AND A RATE LOWER THAN 1 l/s IN EITHER NETWORK COULD INCREASE THE CHANCE OF BLOCKAGE IN THE SYSTEM - HENCE 1 l/s HAS BEEN PROPOSED FOR EACH OUTFALL.

INFILTRATION HAS NOT BEEN PROPOSED AT THIS STAGE. THE REASON FOR THIS IS THAT THE BGS GEOLOGY OF BRITAIN VIEWER SUGGESTS A BEDROCK OF THE WITTERING FORMATION COMPRISED OF SAND, SILT AND CLAY WITH NO SUPERFICIAL DEPOSITS. FURTHERMORE, THE CRANFIELD SOIL AND AGRIFOOD INSTITUTE SOILSCAPES MAPPING INDICATES THAT THE SITE IS UNDERLAIN BY SLOWLY PERMEABLE, LOAMY AND CLAYEY SOILS WITH IMPEDED DRAINAGE. INFILTRATION TESTS HAVE NOT BEEN CARRIED OUT ON SITE, BUT THEY WERE CARRIED OUT ON THE ADJACENT STRATEGIC SITE AS PART OF THE PLANNING APPLICATION FOR UP TO 300 HOMES. THE SOAKAGE TESTING CONFIRMED THAT THE WITTERING FORMATION WAS ALMOST IMPERVIOUS. AS SUCH, INFILTRATION HAS BEEN DISCOUNTED AS PART OF THIS SURFACE WATER DRAINAGE STRATEGY. INFILTRATION TESTING SHOULD BE CARRIED OUT PRIOR TO DETAILED DESIGN AND IF SOME SHALLOW INFILTRATION IS SHOWN TO BE POSSIBLE, THE STRATEGY COULD BE REVISED TO SHOW PERMEABLE PAVING IN THE ACCESS ROADS WHICH MAY REDUCE THE REQUIRED GEOCELLULAR CRATE STORAGE SIZE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT REPORTS, PLANS AND ARCHITECTURAL DRAWINGS
2. THIS DRAWING SHOULD NOT BE SCALED. THERE SHOULD BE NO RELIANCE ON THIS DRAWING WITH REGARDS TO DIMENSIONS. ALL DIMENSIONS SHOULD BE CONFIRMED ON SITE.
3. ANY DISCREPANCY ON THIS DRAWING SHOULD BE REPORTED TO AEGAEA IMMEDIATELY FOR CLARIFICATION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORKS AND FOR THE STABILITY, INSTALLATION AND HEALTH AND SAFETY OF THE WORKS.
5. AEGAEA HAVE PRODUCED THIS DRAWING BASED ON THE DRAWINGS AND INFORMATION PROVIDED BY THE CLIENT AVAILABLE AT THE TIME OF PRODUCTION. WE CANNOT ACCEPT RESPONSIBILITY FOR DISCREPANCIES RESULTING FROM NEW PLANS/ INFORMATION BEING ISSUED POST-ISSUE OF THIS DRAWING. THE CONTRACTOR SHOULD REVIEW THIS DRAWING IN LIGHT OF WIDER SITE INFORMATION SUCH AS CONTAMINATION, UTILITIES SURVEYS AND SITE INVESTIGATIONS
6. IT IS THE RESPONSIBILITY OF THE PRINCIPLE CONTRACTOR TO MAKE THE DESIGNER AND CLIENT AWARE OF SITE-SPECIFIC RISKS AND HAZARDS THAT MAY AFFECT THE DRAWING AND SPECIFICATION

LEGEND

- PROPOSED SURFACE WATER DRAIN
- PROPOSED SLOT DRAIN
- HYDROBRAKE MANHOLE
- SURFACE WATER MANHOLE
- ATTENUATION
- RAINWATER PIPE
- SURFACE WATER PUMPING STATION
- SURFACE WATER GULLY
- TREE ROOT PROTECTION AREA
- CATCHMENT A.1
- CATCHMENT B.1
- CATCHMENT B.2
- CATCHMENT C.1
- CATCHMENT C.2
- OVERLAND FLOW PATH

CLIENT: OSMAN HOMES LIMITED

SITE: LAND NORTH OF THE HOLLIES, HILL STREET, CANMORE, NEW FOREST, SO40 2RX

DRAWING: OUTLINE SURFACE WATER DRAINAGE STRATEGY

DRAWING NUMBER: 387-DR01

DATE: 07/04/2022 | **REV: -**

DRAWN BY: NDD

DRAWING SCALE: SEE DRAWING FOR SCALE BAR

PRELIMINARY DRAWING FOR PLANNING ONLY - NOT FOR CONSTRUCTION

aegaea
Flood risk, water and environment