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CampbellReith
consulting engineers

13577-CRH-Alderholt-20230524.docx

24 May 2023

Dorset Council, Flood Risk Management Team
Place Services,
County Hall,
Dorchester

By Email (LLFAPlanning@dorsetcouncil.gov.uk)ONLY

Dear Alister Trendell

ALDERHOLT MEADOWS - P/OUT/2023/01166

We write in respect to your letter 3rd Aril in which you objected to the Flood Risk Assessment (FRA) and Drainage Strategy submitted in support of the above application.

Further to our telephone conversation of the 17th April we have revised our FRA to address your concerns. Updated sections of the report are enclosed for ease of reference.

Item 1 – As discussed, we cannot be expected to attenuate flows from third party land, and as such, the pass forward rates from these catchments will need to be assessed and agreed with yourselves to ensure there is no detrimental impact on the proposed development surface water drainage system, refer to Section 7.5.6.

We have also added a note to drawing 5050 stating Existing Watercourses / Ditches to be accommodated within the proposed drainage strategy. There is still sufficient room within the current Outline Masterplan, which is only indicative at this stage, to avoid the need for culverting any ditches.

Item 2 – Table 4.1 has been updated to include the greenfield run-off rates in litres/Sec/ha. The greenfield run-off for the site is approximately 8 l/s/ha. The greenfield runoff rates were calculated using the FEH method and appropriate soil characteristics for the site.

Item 3 – I believe Revision P1 was only made available to you for review and had you been given the latest copy of the report, Rev P2, you would have noted that the 45% Climate Allowance had been included.

Item 4 – By maintaining the existing regime for the upstream catchments there will be no increase in attenuation volumes in Basin 2.

Note regarding infiltration testing - Boreholes undertaken by LK Consult in March 2023, to inform the mineral strategy, show groundwater strikes between 1m and 2.5m across the development site. Piezometers have been installed across the site to monitor groundwater levels.

Based upon the shallow groundwater levels encountered it is unlikely that infiltration will be a suitable means of surface water disposal.

CampbellReith
consulting engineers

Yours sincerely

[redacted]

G N TAYLOR
For and on behalf of **CAMPBELL REITH HILL LLP**

Enc.

4.0 SITE CONTEXT

4.1. Site Location

4.1.1. The Site is located at the land off Ringwood Road, Alderholt, as illustrated in Figure 4.1 below. The nearest postcode for The Site is SP6 3DF and the National Grid Reference for the approximate centre of The Site is SU 12228 11913.

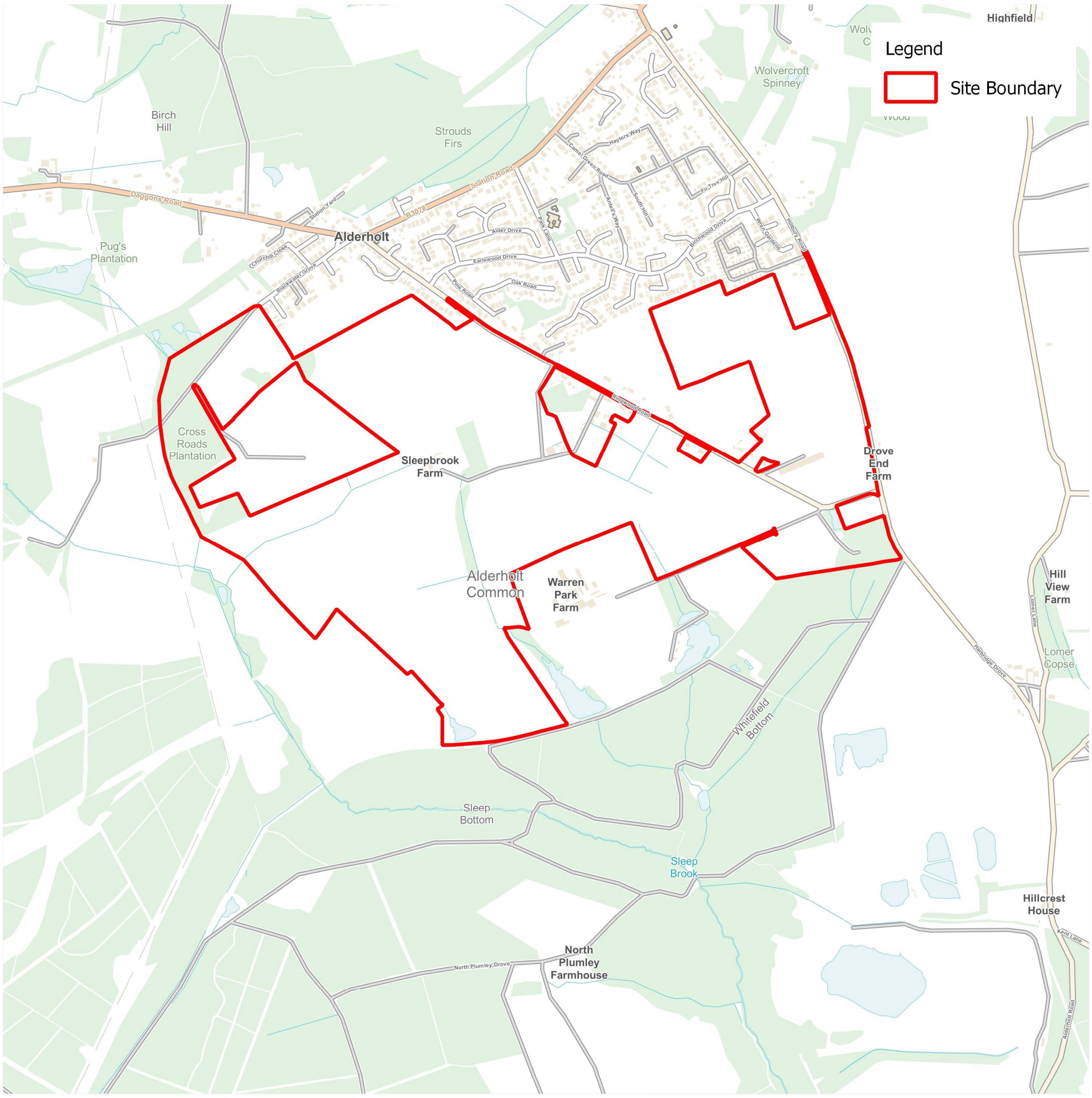


Figure 4.1: Site Boundary (not to scale)

4.1.2. Dorset Council is the Local Planning Authority (LPA) for The Site and also acts as the LLFA for the area.

4.1.3. The Site is predominantly greenfield. The Site is bound by greenfield land to the west, south and east and by residential areas to the north. Vehicular access is primarily available off Ringwood Road which bisects The Site to the north east and off Hillbury Road to the east of The Site.

4.1.4. The surrounding area predominantly consists of agricultural land and wooded areas. There is also a solar farm to the north west.

4.2. Site History

4.2.1. Information relating to The Site history has been obtained by reference to the Groundsure Report and CRH Desktop Study (13577-CRH-XX-XX-RP-LQ-0001_DTS). The Site history is open land in the south of The Site area dating back to 1870, in addition to trees and woods in the centre and to the west. Sleep Brook and a pond are present from 1886 in the south west and west. Marshland is present across The Site from 1889. Several farms are noted from 1972 and the south west site area is labelled as Alderholt Common from 1994.

4.3. Topography

4.3.1. Lidar data has been obtained as part of this assessment and is shown in Figure 4.2 below.

4.3.2. Due to The Site's predominant current use as agricultural land, it is expected that the existing ground cover would be undulating. The Site has a high point to the north, near The Site boundary, falling in all directions towards the outer boundary of The Site. Ground levels are typically shown to range from approximately 62m AOD at the high point to the north of The Site to approximately 42m AOD on the south western boundary and approximately 48m AOD to the southern boundaries. The eastern boundary also falls from approximately 62m AOD to 50m AOD in a southerly direction.

4.3.3. A topographical survey was undertaken by D G Yeatman Surveying & Engineering Ltd in February 2021 [ref: Alderholt-0221] and is contained in Appendix C.

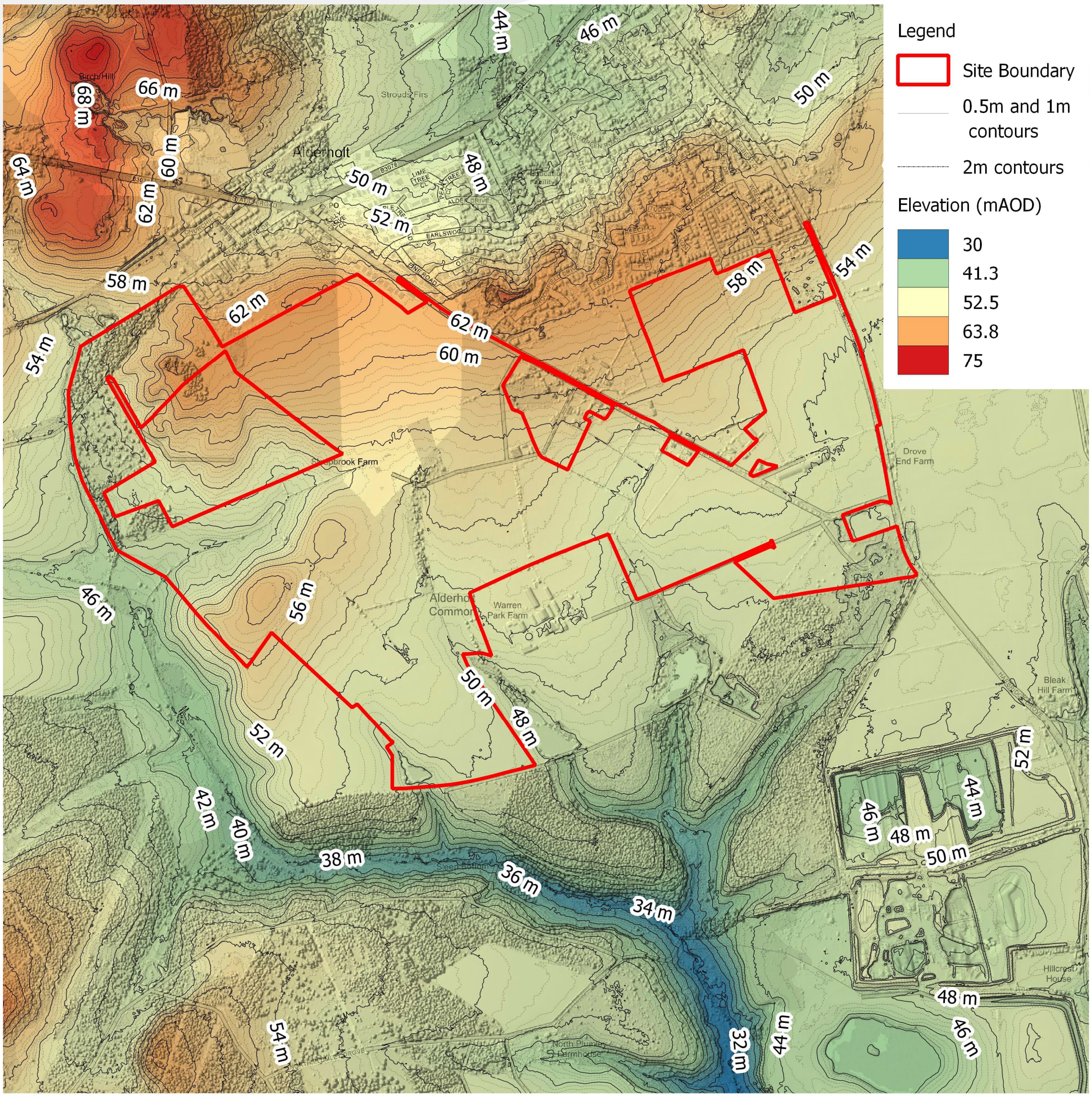


Figure 4.2: Lidar Data

4.4. Geology

4.4.1. British Geological Survey maps[4] indicate that The Site is likely to have a bedrock geology of Parkstone Sand Member (sand) with superficial river terrace deposits (sand and gravel). Areas to the west of The Site associated with the brook are likely to have a bedrock geology of Broadstone Clay Member (clay, silty) with superficial clay and silt head deposits. In addition, the Landis Soilscapes Map[5], shows ground conditions at The Site to be mostly "*Naturally wet very acid sandy and loamy soils*" with a high water table, but to the east it has areas of "*Slightly acid loamy and clayey soils with impeded drainage*" and "*Freely draining very acid sandy and loamy soils*".

4.4.2. Further ground investigations are required as part of future detailed design to confirm the on-site geology. The potential for infiltration is very varied across The Site and as such detailed

[4] https://www.bgs.ac.uk/
[5] http://www.landis.org.uk/soilscapes/#

infiltration testing will be required prior to the commencement of development to determine if areas of infiltration are feasible. For the purposes of this FRA, it has been assumed that infiltration is not feasible.

4.5. Hydrology

4.5.1. A desk-study review of Ordnance Survey mapping notes several land drains across The Site and a small pond in the south. Sleep Brook, an ordinary watercourse, is located to the far west of The Site and flows towards Hammer Brook, south of The Site boundary. Hammer Brook then flows into the River Avon, an EA main river, approximately 1.9 km to the east of The Site boundary. The site walkover on 4th May 2022 confirmed the presence of several on-site drainage ditches across The Site.

4.5.2. Figure 4.3 displays the watercourses on and adjacent to The Site.

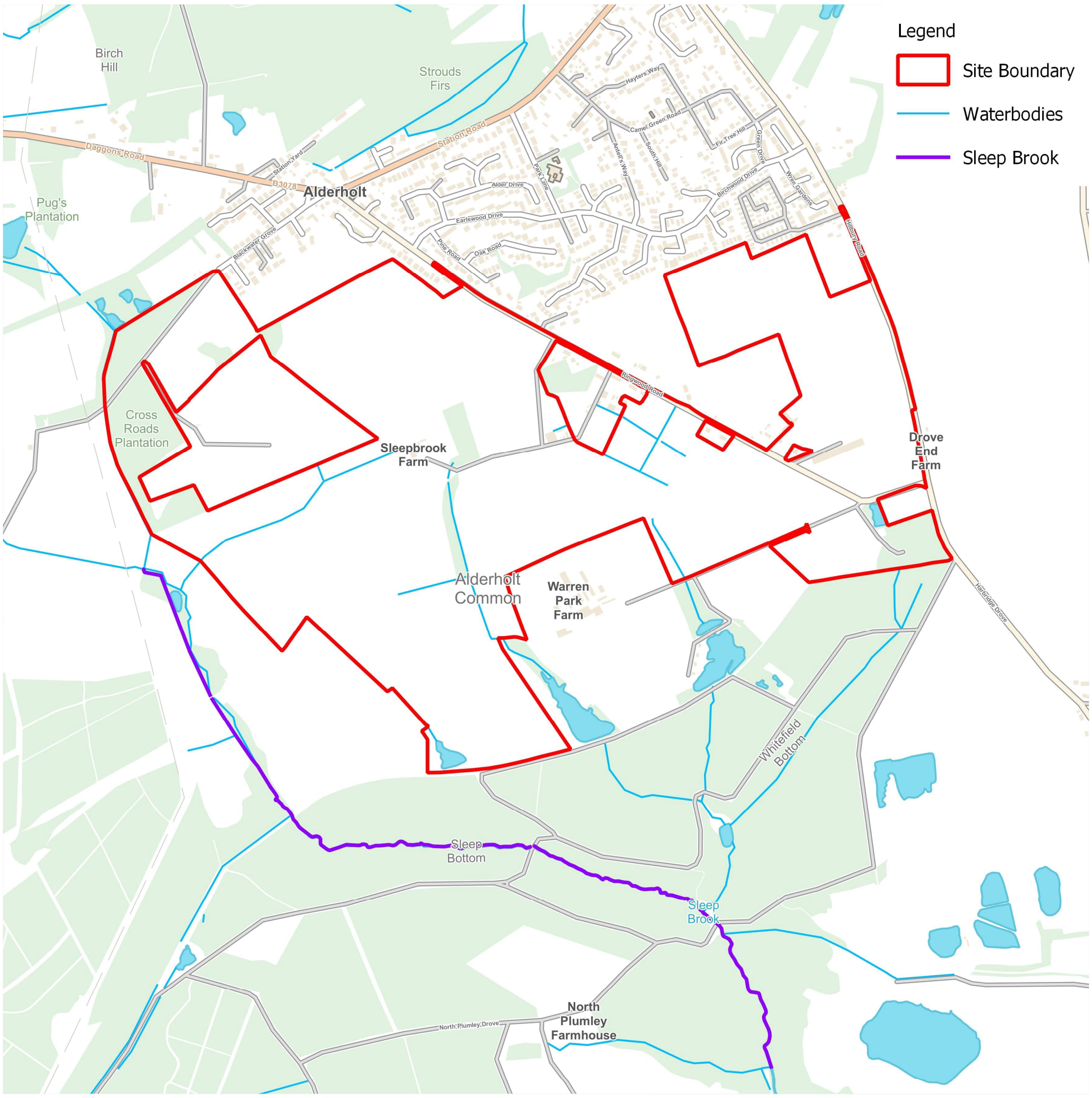


Figure 4.3: Onsite watercourses

4.6. Hydrogeology

4.6.1. The Site is not located on a Source Protection Zone (SPZ).

4.6.2. The Site is situated above a Secondary A aquifer. The superficial deposits are classified as a Secondary A aquifer. The groundwater vulnerability for The Site is medium to high.

4.6.3. Boreholes undertaken by LK Consult in March 2023 to inform the mineral strategy show groundwater strikes between 1m and 2.5m across the development site. Piezometers have been installed across the site to monitor groundwater levels.

4.7. Existing Site Drainage

4.7.1. Wessex Water is the incumbent sewerage utility provider for the area. A review of the Wessex Water's Records confirms there is no on site drainage; the closest public drainage system is to the north of Yhe Site serving the existing Alderholt village.

4.7.2. There is an existing Wessex Water Sewage Pumping Station on Sandleheath Road approximately 850m north of the northern site boundary. This existing pumping station discharges to Fordingbridge Sewage Works on Frog Lane (approximately 1.8km north east of The Site) via a rising main and existing sewer.

4.7.3. There are multiple watercourses located on or within close proximity to The Site, as well as multiple lakes/ponds. Within The Site, there are several drains that flow to two ponds south of The Site. These ponds then flow to Hammer Brook which eventually flows to the River Avon (an EA main river), south east of Yhe Site. Sleep Brook flows from north to south on the east of The Site and also runs into Hammer Brook.

4.7.4. The natural surface water flow paths have been devised from reviewing the available Lidar data and is shown on Figure 4.4 below.

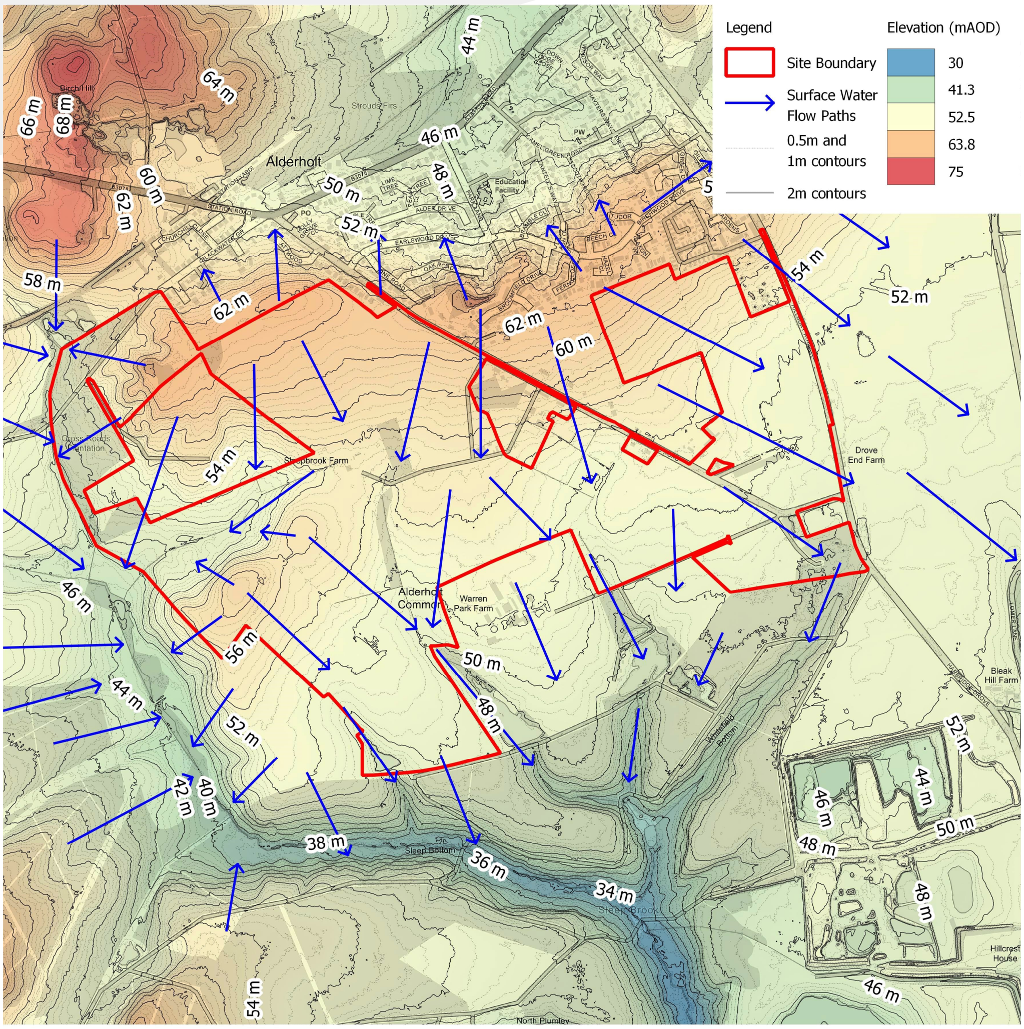


Figure 4.4: Surface Water Flow Paths

4.7.5. Due to the size of The Site and based on the existing topography, the developable area has been split into four surface water catchments each with individual discharge rate restrictions. Catchment 2 has been split further into Catchment 2 (Development Land) and Catchment 2a (Contributing Land from outside the development). The greenfield runoff rates were calculated using the FEH method and are summarised in Table 4.1. The catchments are displayed in Figure 4.5.

Table 4.1: Greenfield runoff rates

Catchment	Area (ha)	Greenfield Runoff Rate (litres/sec/ha)	Greenfield Runoff Rate (litres/sec)		
		Qbar	1 in 1 year	1 in 30 year	1 in 100 year
1	17.0	8.20	118.7	321.1	445.4
2 & 2a	14.0 + 3.5	8.14	96.9 +24.2	262.2 + 65.5	363.6 + 90.91
3	17.0	8.07	116.6	315.5	437.6
4	13.0	8.28	91.5	247.5	343.2

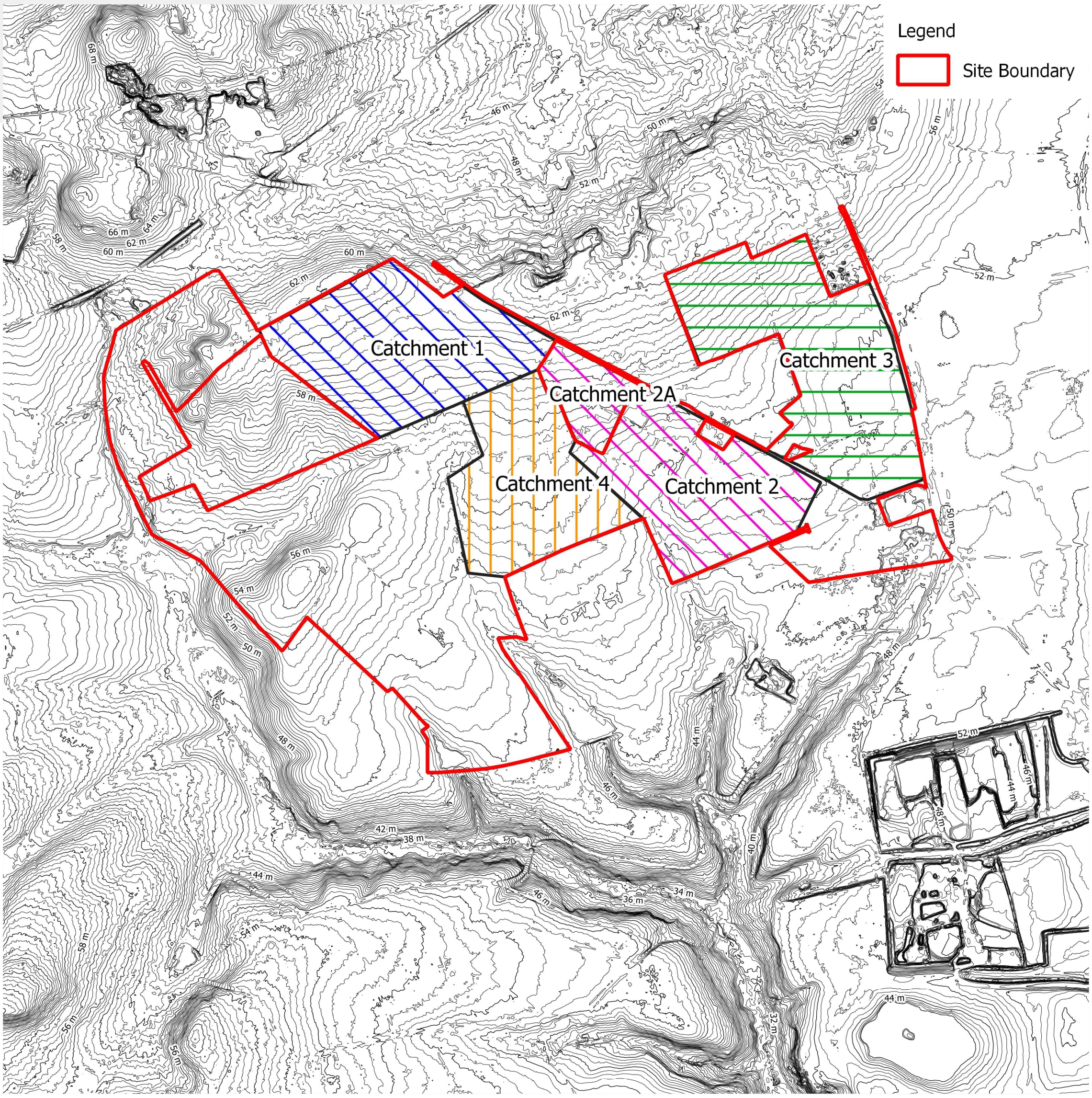


Figure 4.5: Surface Water Catchment Areas

7.0 SURFACE WATER MANAGEMENT

7.1. Overview

7.1.1. The surface water drainage system has been designed in accordance with the NPPF and the accompanying Guidance and Technical Standards for SuDS. It also complies with the prevailing requirements under Building Regulations Part H.

7.1.2. In line with the SuDS hierarchy under paragraph 80 of the PPG, surface water should be managed (in order of preference) by:

1.) Infiltration to the maximum extent that is practical – where it is safe and acceptable to do so

2.) Discharge to watercourses

3.) Discharge to surface water sewer, highway drain or another drainage system

4.) Discharge to combined sewers (last resort)

7.1.3. The use of infiltration as a means of surface water disposal is currently unknown but due to the shallow groundwater encountered across the site it has been discounted at this stage and the strategy is proceeding on the basis of discharge to watercourses. The watercourses are in close vicinity and this option is next in line in accordance with the hierarchy.

7.2. Site Constraints

7.2.1. A review of The Site characteristics has informed the following site constraints:

- Existing Land Drains across The Site
- Potential Surface water flows from adjoining land
- An area of Flood Zone 2 and 3 to the west of The Site (outside of the developable area)

7.3. Existing and Proposed Impermeable and Permeable Areas

7.3.1. The red line boundary of The Site is wholly greenfield, but only approximately 54.2Ha is shown as developable area within the masterplan. The existing and proposed impermeable and permeable areas are presented in Table 7.1. The proposed impermeable area is based on 70% (60% + 10% Urban Creep) of the developable area.

Table 7.1: Existing and Proposed Impermeable and Permeable Areas

	Permeable (ha)	Impermeable (ha)
Existing	122	0
Proposed	84.1	37.9

7.4. Proposed Surface Water Runoff Rates

7.4.1. As previously mentioned, four surface water catchment areas have been analysed and the Greenfield runoff rate (Qbar) calculated for each as tabulated in Table 7.2.

7.5. Surface Water Drainage Strategy

7.5.1. The proposed drainage strategy layout presented in Appendix F, illustrates the SuDS features proposed to manage the surface water runoff from The Site.

7.5.2. The surface water drainage strategy aims to control runoff from impermeable areas at source and attenuate through SuDS features.

7.5.3. The following SuDS features have been considered within the proposed surface water drainage strategy:

- Swales
- Attenuation Structures

7.5.4. The surface water runoff within each catchment will discharge into the associated attenuation structures via swales.

7.5.5. Table 7.2 summarises the required attenuation volumes and plan areas for each of the Catchments to cater for the Critical 1 in 100 year + 45% Climate Change Event, based on a 1.5m deep basin plus a 400mm freeboard, with 1 in 3 side batters.

Table 7.2: Required attenuation per catchment

Catchment	Impermeable Area (ha)	Qbar (l/s)	Attenuation volume (m^3)	Attenuation Plan Area (m^2)
1	11.2	139.6	7750	6120
2	9.0	114	6115	4990
3	8.6	137.2	5430	4440
4	9.2	107.6	6445	5190

7.5.6. Flows from Catchment 2a are proposed to pass through The Site unrestricted maintaining the current status quo. Pass forward flow rates to be agreed with the LLFA.

7.5.7. The proposed surface water drainage system can effectively control all runoff generated within The Site and maintain pre-development greenfield runoff, without increasing flood risk elsewhere. The proposed surface water drainage strategy is contained in Appendix F.

7.5.8. The maintenance of SuDS is vital ensuring that they work as efficiently as they set out to do and is discussed in Chapter 9.

7.6. Surface Water Quality

7.6.1. The SuDS components within the surface water drainage strategy have been designed in accordance with the guidance set-out in the SuDS Manual.

7.6.2. Treatment within SuDS components is essential for frequent low intensity and duration rainfall events, where urban contaminants are being mobilised and washed off urban surfaces and the aggregated contribution to the total pollutant load to the receiving surface water body is potentially high. For rainfall events greater than the 1 in 1 return period, the pollutants become diluted and the environmental risks will be reduced which means that the SuDS treatment process becomes less crucial. Treatment effectiveness is strongly linked to the hydraulic control of runoff, in particular velocity control and retention time.

7.6.3. Table 26.2 of the CIRIA SuDS Manual provides the pollution hazard indices for different land use classifications as shown in the table below.

Table 7.3: CIRIA Pollution hazard indices for different land use classifications

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Commercial/Industrial Roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads, car parks with infrequent change	Low	0.5	0.4	0.4

7.6.4. The level of pollution associated with the Proposed Development is low.

7.6.5. Table 7.4 below summarises the treatment efficiency of different SuDS components discharging to surface waters as detailed in Chapter 26 of the SuDS Manual. As this report is in support of an outline planning application, numerous features are considered to be feasible on The Site at this stage and the main ones that are anticipated to be used have been listed in Table 7.3. Specific SuDS components to be used are yet to be determined.

Table 7.4: CIRIA Indicative SuDS Mitigation Indices for Discharges to surface water

	Mitigation Indices		
Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

7.6.6. Where multiple drainage features are used, the efficiency of the secondary system to treat water is reduced. The attenuation structures on site are anticipated to be a combination of detention basins and ponds. For the purpose of this mitigation assessment, the lowest value (detention basin) have been used as a worst case scenario. By using a swale discharging into a detention basin the combined mitigation indices is as follows:

Table 7.5: Mitigation Indices for Proposed Combined Drainage System

	Mitigation Indices	Total Mitigation
TSS	0.5 + 0.5(0.5)	0.75
Metals	0.6 + 0.5(0.5)	0.85
Hydrocarbons	0.6 + 0.5(0.6)	0.90

7.7. Foul Water Strategy

7.7.1. The foul strategy includes a proposed on-site pumping station at a low point of The Site in the south east, which will then discharge water towards the existing Sewage Pumping Station on Sandleheath Road (10588 SPS), approximately 2km north of The Site.

7.7.2. The current proposal, based on an initial assessment, is that this route from the proposed pumping station to the existing SPS would consist of a 250mm diameter rising main approximately 1km in length to a high point in Hillbury Road. At this high point, it is then proposed there would be a break chamber, from where a gravity sewer would be required to direct the flows to the existing SPS. This gravity sewer would need to be approximately 1km in length and 300mm in diameter (with the final 79m leading to the existing SPS at 600mm diameter). This could potentially make use of the existing sewer via upgrading or a new sewer would be constructed as required, dependant on further assessment and subject to change.

7.7.3. The proposed Drainage strategy drawing is presented in Appendix F.

7.7.4. To enable these proposals, further upgrades would be required on the existing drainage infrastructure downstream of the existing SPS. These upgrades would involve upsizing the outgoing sewers from the existing SPS as a result of the additional inflow.

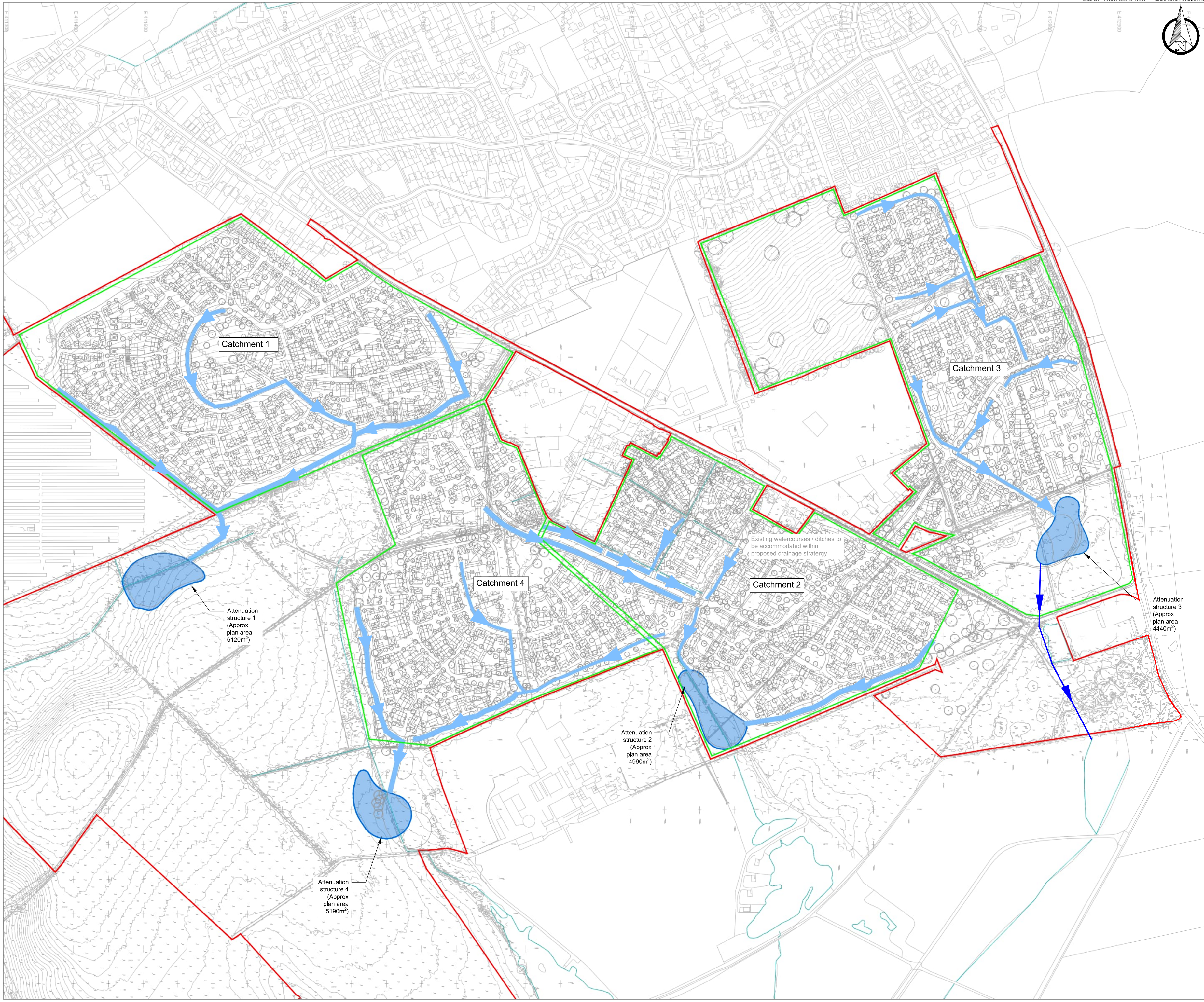
7.7.5. Wessex Water has performed an assessment on their existing 10588 SPS and have determined that this strategy is feasible. They are supportive of the application and will continue to be involved in further assessments and decisions. Their Development Flow calculations and Proposed Development SPS calculations are presented in Table 7.6 and 7.7 respectively.

Table 7.6: Development Flow Calculations

Development Element	Calculations	Sewer Size Required	Calculation Source
1700 dwellings	17000 dwellings @ 4000 l/dwelling/day =6,800,000l/d =78.7l/s	450mm	SSG Section B3.1.1
60 bed care home	60 beds @ 200 l/dwelling/day =12,000l/d =0.14l/s	450mm	DS500 Appendix 1 “2015/16 Wessex Water Analysis of measured flows”
Employment use	0.964 ha @ 300 l/day/100m^2 =0.34l/s	450mm	DS500 Appendix 1 “2015/16 Wessex Water Analysis of measured flows”
Local centre	0.674 ha @ 150 l/day/100m^2 =0.12l/s	450mm	DS500 Appendix 1 “2015/16 Wessex Water Analysis of measured flows”
Development Total	78.7l/s + 0.14l/s + 0.34l/s + 0.12l/s = 79.3l/s	450mm	SSG Section B3

Table 7.7: Proposed Development SPS Calculations

Development SPS Specifications	Calculations	Calculation Source
Development total flow	= 79.3 l/s	SSG Section B3
Development pump rate	= 79.3 l/s @ 50% = ~39 l/s	SSG Section D5.6.1
Rising main size required	SDR17 250mm external (221mm internal)	SSG Section D6.3.1
1700 dwellings	1700 dwellings @ 160 l/dwelling = 272,000 l/1000 = 272m^3	SSG Section D5.5.3
60 bed car home	0.14 l/s peak flow *60 sec* 60 min = 504 l/1000 = 0.5m^3	SSG Section D5.5.3
Land offered for employment use	0.34 l/s peak flow *60 sec* 60 min = 1,224 l/1000 = 1.2m^3	SSG Section D5.5.3
Local centre	0.12 l/s peak flow *60 sec* 60 min = 432 l/1000 = 0.4m^3	SSG Section D5.5.3
Development Total	272m^3 + 0.5m^3 + 1.2m^3 + 0.4m^3 = 274m^3	SSG Section D5.5.3



Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing status:
   - **P: Preliminary** Evolving drawings for approvals, tenders, billings etc.
   - **C: Construction** Fully developed drawings issued under instructions for construction.
6. Only status **C** drawings to be used for construction.
7. Suitability code:

   Work in progress
   S0 - Work in progress
   Shared (Non-contractual)
   S1 - For coordination, **S2 -** For information, **S3 -** For internal review and comment, **S4 -** For construction approval.
   Documentation (For contractors purposes)
   D1 - For Costing, **D2 -** For Tender, **D3 -** For contractor design, **D4 -** for manufacture/procurement.
   Construction
   A - For construction, **B -** For construction but with comments (i.e. areas in abeyance), **CR -** Construction Record (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
8. Proposed Masterplan based on 22-1126 SL01 Rev P6 (Received from Scott Worsfold Associates on 07/10/22). This Masterplan has been isntered onto the LIDAR data and no guarantee as to the accuracy of the layout in relation to the LIDAR is given or implied. Masterplan shown for information only.
9. All existing survey information shown or referred to is based upon topographical survey prepared by D G Yeatman Surveying & Engineering Ltd, Dwg reference ALDERHOLT-0221, dated February 2021 as supplied to CampbellReith - no warranty as to the accuracy of the information is given or implied.
10. For further information and calculations on the drainage strategy refer to 13577-CRH-ZZ-XX-RP-C-0001_FRA.

Key

- Site Boundary
- Proposed Indicative Swale Locations (4m-6.8m width)
- Catchment Boundaries
- Existing Surface Water Features
- Proposed Piped Outfall

Rev	Description	Date	By
P3	Note regarding Existing Watercourses added	23/05/23	IC
P2	Attenuation Areas Updated	05/01/23	IC
P1	Issued for information	10/11/22	RF

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Job Title
Alderholt Meadows, Fordingbridge

Client
Dudsbury Homes (Southern)

Proposed Surface Water Drainage Strategy

Drawn by	Date made	Scale @ A1	Checked by	Suitability	CR Project
RF	21/09/22	1:2500	GT	S2	13577

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
13577	CRH	ZZ	XX	DR	C	5050	P3