Technical Note 1: Water Neutrality Statement

Site: Land at Crosby Farm, Lyons Road, Slinfold
Prepared by: Laura Jagiela
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Date: 23 July 2024

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1.0 Introduction

1.1 This Water Neutrality Statement (WNS) has been prepared on behalf of Antler Homes to demonstrate how the proposed development will achieve water neutrality.

1.2 Following the issue of Natural England's (NE's) Position Statement on Water Neutrality within the Sussex North Water Supply Zone (SNWSZ), Horsham District Council (HDC) require all new and reserved matters planning applications and prior approvals seeking to satisfy Regulation 77 to demonstrate that the development is water neutral and/or that they do not result in a significant effect. NE's Position Statement can be found in full within **Appendix A**.

1.3 The SNWSZ covers part of the Horsham District, as well as parts of the neighbouring Chichester, Arun and Crawley Districts. A plan showing the SNWSZ area and the location of the farm can be found in **Appendix B**.

1.4 This statement sets out the following:

- Baseline calculations for the existing development;
- Additional demand as a result of the proposed development;
- Water reduction measures, such as water efficient fixtures and fittings and rainwater harvesting; and
- Measures to offset any remaining deficit following the above.

2.0 Background

2.1 The proposed development is located off Lyons Road in Slinfold, Horsham (RH13 0RY).

2.2 The site consists of two class E(i) office buildings, The Old Dairy and The Granary. A copy of the existing site plans can be found in **Appendix C**.

2.3 The proposal is to convert each building into a two-bedroom dwelling. A copy of the proposed plans can be found in **Appendix D**.

3.0 Baseline Water Usage

3.1 The existing site consists of two class E(i) office building. The Old Dairy, with a lettable floor area of 72m^2 and The Granary, with a lettable floor area of 96m^2.

3.2 Employment Densities have been taken from the OffPAT Employment Densities Guide. The guide states that there will be one full time employee (FTE) per 12m^2. This equates to 6 employees for The Old Dairy and 8 employees for The Granary.

3.3 Water bills are not available for the site, therefore a flow survey was undertaken on 19th July 2024 to determine the water usage of the existing buildings. A copy of the flow survey can be found in **Appendix E**.

3.4 The flow rates for the existing buildings have been input into the BREEAM 2016 Water Calculator. A copy of the calculations and the table summarising the flow restrictions per use are provided in **Appendix F**. This gives a water usage of 49.62 litres per person per day for The Old Dairy and 52.75 litres per person per day for The Granary.

3.5 Following the flow survey The Old Dairy has a baseline water usage of 297.72 litres per day and The Granary has a baseline water usage of 422.00 litres per day. This gives a total baseline water usage of 719.72 litres per day. A copy of the calculations can be found in **Appendix G**.

3.6 The proposal is for the conversion from class E(i) office buildings to dwellings, therefore there will be 719.72 litres per day spare capacity for the proposed development.

4.0 Additional Demand

4.1 The proposal for the site is to convert each building into a two-bedroom dwelling.

4.2 Census data has been used to estimate the average number of people in the homes, which is 1.88 for a two-bedroom home. The total population for the proposed development will be 3.76.

The Old Dairy

4.3 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that The Old Dairy will achieve a water consumption of 86.46 litres per person per day, which includes an allowance of 5 litres per person per day for external water usage. A copy of the Part G calculation can be found in **Appendix H** and is summarised in Table 4.1, below:

	Total Water Usage (l/p/day)	Mains Water Usage (l/p/day)	RWH System Usage (l/p/day)
WC (full flush)	5.84		5.84
WC (part flush)	5.92		5.92
Taps (Excluding Kitchen)	5.85	6.32	
Shower	26.22	26.22	
Bath	16.50	16.50	
Kitchen Taps	12.12	12.12	
Washing Machine	13.50		13.50
Dishwasher	3.56	3.56	
Total	89.51	64.25	25.26
Normalisation Factor	0.91	0.91	0.91
Total	81.46	58.47	22.99
External Water Use	5.00		5.00
Total	86.46	58.74	27.99

Table 4.1 - Proposed Water Usage (The Old Dairy)

4.4 This will be achieved through the use of water efficient fixtures and fittings, including dual flush toilets. Examples of the proposed fixtures and fittings are shown in **Appendix I**.

4.5 Using the Part G water consumption figure of 86.46 litres per person per day and a population of 1.88 it is estimated that the water consumption of The Old Dairy will be 162.54 litres per day.

The Granary

4.6 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that The Old Dairy will achieve a water consumption of 78.16 litres per person per day, which includes an allowance of 5 litres per person per day for external water usage. A copy of the Part G calculation can be found in **Appendix J** and is summarised in Table 4.2, below:

	Total Water Usage (l/p/day)	Mains Water Usage (l/p/day)	RWH System Usage (l/p/day)
WC (full flush)	5.84		5.84
WC (part flush)	5.92		5.92
Taps (Excluding Kitchen)	5.85	6.32	
Shower	33.60	33.60	
Kitchen Taps	12.12	12.12	
Washing Machine	13.50		13.50
Dishwasher	3.56	3.56	
Total	80.39	55.13	25.26
Normalisation Factor	0.91	0.91	0.91
Total	73.16	50.17	22.99
External Water Use	5.00		5.00
Total	78.16	50.17	27.99

Table 4.2 – Proposed Water Usage (The Granary)

4.7 This will be achieved through the use of water efficient fixtures and fittings, including dual flush toilets. Examples of the proposed fixtures and fittings are shown in **Appendix I**.

4.8 Using the Part G water consumption figure of 78.16 litres per person per day and a population of 1.88 it is estimated that the water consumption of The Granary will be 146.94 litres per day.

Total Additional Demand

4.9 The Old Dairy has a proposed water usage of 162.54 litres per day and The Granary has a proposed water usage of 146.94 litres per day.

4.10 Overall, the total water usage for the proposed development is 309.48 litres per day.

5.0 Water Reduction Measures

5.1 To help mitigate the increase in water demand it is proposed to incorporate rainwater harvesting to the proposed development. Each dwelling will have its own rainwater harvesting system and tank.

5.2 The water collected by the rainwater harvesting system will be utilised for flushing toilets, in the washing machine, and all other uses will be mains water fed.

5.3 Noting these water uses, Table 4.1 and 4.2 above confirms that 27.99 litres per person per day can be supplied by the rainwater harvesting system to both dwellings. This equates to 52.62 litres per day, based on a population of 1.88 people for The Old Dairy and 52.62 litres per day, based on a population of 1.88 people for The Granary.

5.4 The size of the rainwater harvesting tanks for the proposed dwellings have been calculated as per the guidance set out in BS EN 16941-1:2018 and will be large enough to store 9.6% of the Annual Water Demand. This will ensure that the tanks will provide at least 35 days of storage for periods of drought, as required by HDC.

5.5 The roof material of the proposed buildings is unknown and therefore a conservative yield coefficient of 0.8 has been used in the calculations. Part of the roof area of The Old Dairy is flat and therefore has not been included within the rainwater harvesting calculations.

5.6 The calculations confirm that the yields are sufficient enough to meet the demands. Calculations used the annual rainfall data from the nearest MET Office climate station to the proposed site, which is North Heath. The calculations are summarised in Table 5.1 below and can be found in full in **Appendix K**.

Unit	Population	Roof Area (m^2)	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank size (litres)
The Old Dairy (two-bedroom)	1.88	105	6,232	1,844	2,600
The Granary (two-bedroom)	1.88	68	4,036	1,844	2,600

Table 5.1 – Rainwater Harvesting Sizing Calculation

5.7 A typical layout and specification for a rainwater harvesting system is show in **Appendix L**. The illustration shows how the rainwater will be collected, filtered and then returned to the property for re-use.

5.8 The dimensions of the proposed tanks can be found in **Appendix M**.

5.9 A Management and Maintenance Plan has been prepared for the rainwater harvesting systems and can be found in **Appendix N**.

5.10 Once rainwater harvesting has been incorporated into The Old Dairy the mains water usage will be reduced to 58.47 litres per person per day, which equates to 109.92 litres per day, based on an occupancy of 1.88 people.

5.11 Once rainwater harvesting has been incorporated into The Granary the mains water usage will be reduced to 50.17 litres per person per day, which equates to 94.32 litres per day, based on an occupancy of 1.88 people

5.12 The total water usage for the proposed development following the incorporation of the above measures is 204.24 litres per day.

5.13 Overall, following the demolition of the existing site, there will be 719.72 litres per day spare capacity for the proposed development. Since 204.24 litres per day is needed for the redevelopment, this results in a net reduction of 515.48 litres per day for the site as a whole.

6.0 Offsetting Measures

6.1 As the water usage can be managed on the site and demonstrate an overall reduction in mains water consumption, further offsetting is not required.

7.0 Summary and Conclusions

7.1 This Technical Note provides a water neutrality calculation for The Old Dairy and The Granary, Lyons Road, Slinfold.

7.2 The proposal is to incorporate water efficient fixtures and fittings and rainwater harvesting to the proposed dwellings.

7.3 The proposed development can demonstrate water neutrality without further offsetting being required.

7.4 In conclusion, the development at The Old Dairy and The Granary will be water neutral within the SNWSZ and Water Neutrality cannot be an impediment to the progress of this application, as it is using an offsetting scheme approved by and with a precedent set by Natural England.

Appendix A

Natural England's Position Statement

Natural England's Position Statement for Applications within the Sussex North Water Supply Zone

September 2021 – Interim Approach

Please take the following as Natural England's substantive advice for all applications which fall within Sussex North's Water Supply Zone.

Sussex North Water Supply Zone

Arun Valley SPA, SAC and Ramsar Site- Sussex North Water Supply Zone

The Sussex North Water Supply Zone includes supplies from a groundwater abstraction which cannot, with certainty, conclude no adverse effect on the integrity of;

- Arun Valley Special Area Conservation (SAC)
- Arun Valley Special Protection Area (SPA)
- Arun Valley Ramsar Site.

As it cannot be concluded that the existing abstraction within Sussex North Water Supply Zone is not having an impact on the Arun Valley site, we advise that developments within this zone must not add to this impact. This is required by recent caselaw, Case C-323/17 People over wind and Sweetman. Ruling of CJEU (often referred to as sweetman II) and Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu Case C-293/17 (often referred to as the Dutch Nitrogen cases).

Between them these cases require Plans and Projects affecting sites where an existing adverse effect is known (i.e. the site is failing its conservation objectives), to demonstrate certainty that they will not contribute further to the existing adverse effect or go through to the latter stages of the Regulations (no alternatives IROPI etc).

Developments within Sussex North must therefore must not add to this impact and one way of achieving this is to demonstrate water neutrality.

In addition, the Gatwick Sub regional Water Cycle Study concluded that water neutrality is required for Sussex North to enable sufficient water to be available to the region.

The definition of water neutrality is the use of water in the supply area before the development is the same or lower after the development is in place.

Strategic approach

Natural England has advised that this matter should be resolved in partnership through Local Plans across the affected authorities, where policy and assessment can be agreed and secured to ensure water use is offset for all new developments within Sussex North. To achieve this Natural England is working in partnership with all the relevant authorities to secure water neutrality collectively through a water neutrality strategy.

Whilst the strategy is evolving, Natural England advises that decisions on planning applications should await its completion. However, if there are applications which a planning authority deems critical to proceed in the absence of the strategy, then Natural England advises that any application needs to demonstrate water neutrality. We have provided the following agreed interim approach for demonstrating water neutrality;

Minimising water use of new builds.

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets (e.g., 85L/pp/day*)

  This can be achieved by measures such as:

- Grey water recycling (advantage of being reliable in hot dry weather);
- Rainwater harvesting;
- Water efficient fixings (such as shower aerators) to demonstrably reduce demand-this would need to be suitably certain.

In addition, water offsetting is required

- One way to achieve this is retrofitting of council owned properties/commercial buildings-located within Sussex North. Examples include:

- Grey water recycling- (for example there are clear opportunities for commercial properties).
- Rainwater harvesting of commercial settings;
- Installation of water reduction fittings in Council-owned buildings.

These measures need to be implemented until such time as a more sustainable water supply has been secured.

It will also need to be ensured that measures are not already proposed (for example in Southern Water's Management Plan) to avoid double-counting.

Any mitigation must be suitably certain in order to comply with the Habitats Regulations and Caselaw.

If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

The securing of water neutrality is a matter which needs to be resolved at a strategic level and Natural England is working with the relevant authorities and the water company to achieve this. In light of this, Natural England will not be engaging with individual planning applications whilst the strategy is evolving.

***This this is the reasonably achievable figure with the above measures based on the early data from the strategic solution and may be subject to change as the strategic solution evolves.**

Appendix B

Sussex North Water Supply Zone Map

East Hampshire District

Waverley District (B)

Mole Valley District

Crawley District (B)

Chichester District

Horsham District

Mid Sussex District

Arun District

Borough of Adur & Worthing

Local Planning Authorities

Sussex North WRZ DEFRA

Horsham District Council

Parkside, Chart Way, Horsham
West Sussex RH12 1RL.
Barbara Childs : Director of Place

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Sussex North Water Resource Zone

Chichester Horsham Crawley

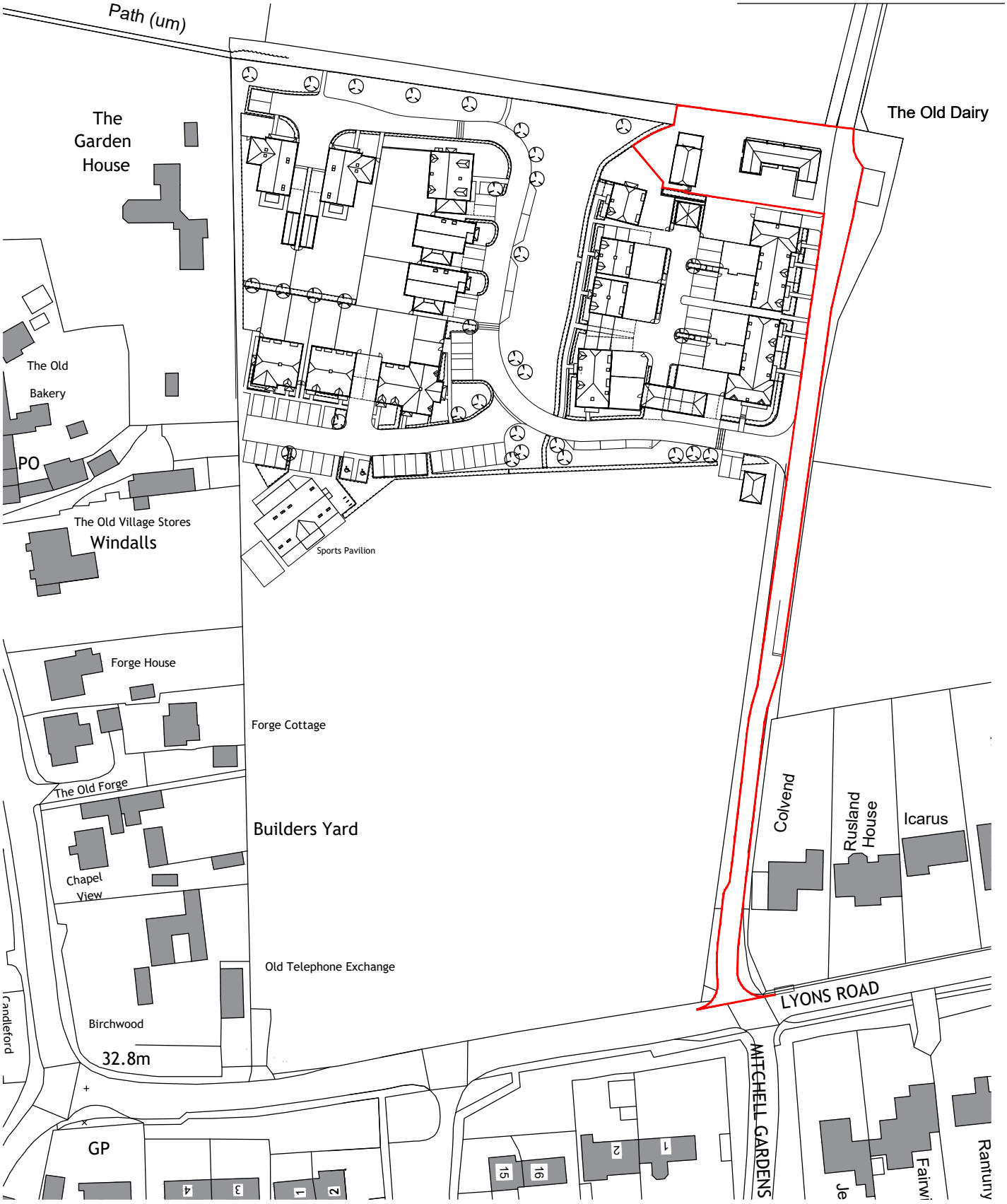
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Appendix C

Existing Site Plans

CDM 2015 Health & Safety Information:

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Client's Name
Antler Homes

Drawing Title
Existing Site Location Plan

Drawn: JT | Checked: SLG | Date: 22.08.22

Job No: 7225 | Drawing No: PL001 | Rev: -

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Land at Crosby Farm, Slinfold

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Status
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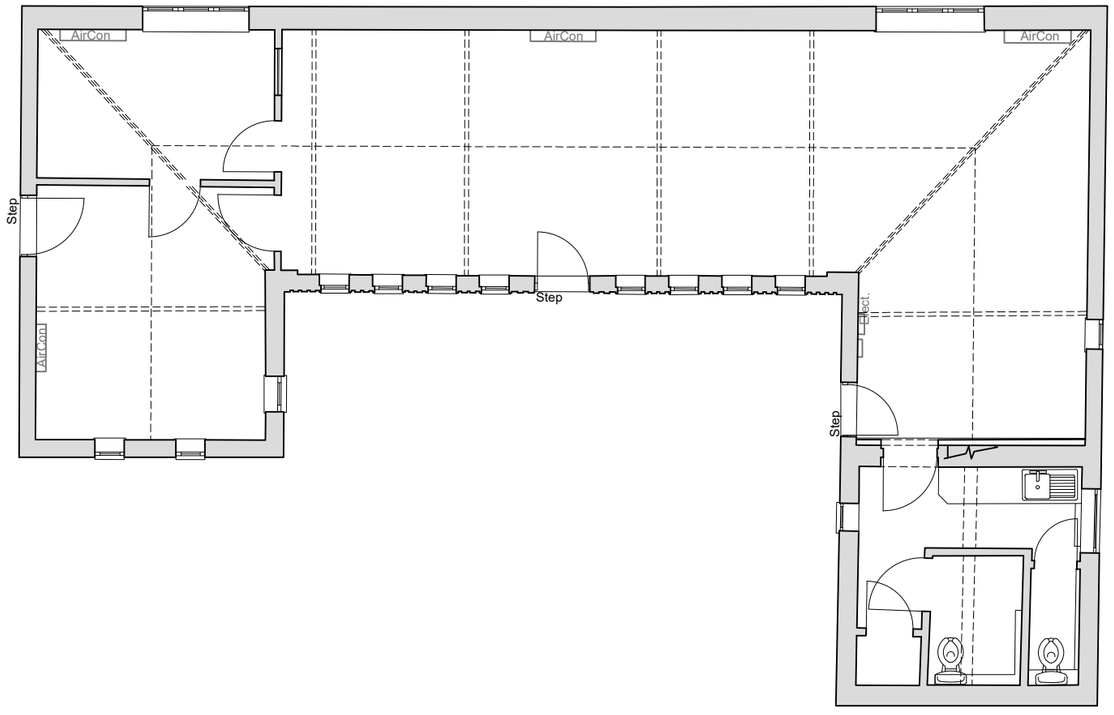
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Existing Ground Floor Plan

Client's Name
Antler Homes

Job Title
Land at Crosby Farm, Slinfold

Drawing Title
Existing Plans - The Old Dairy

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1:100 @ A3
metres 1 2 3 4

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Status
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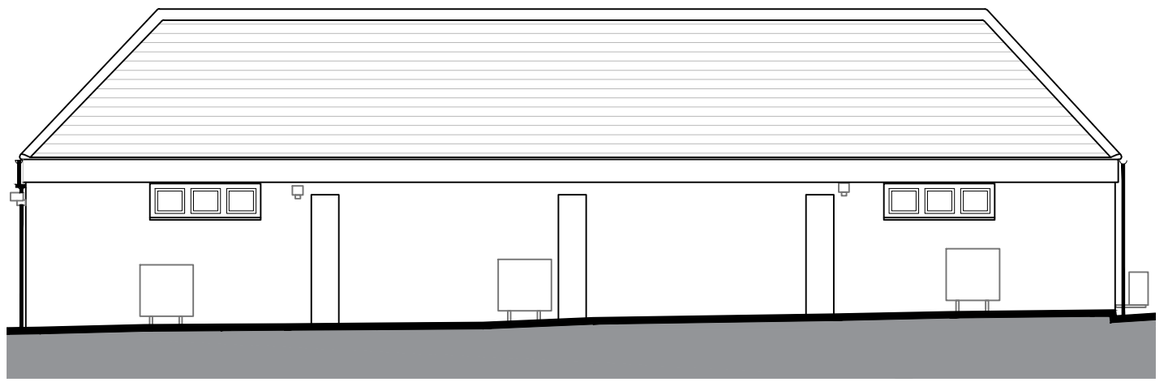
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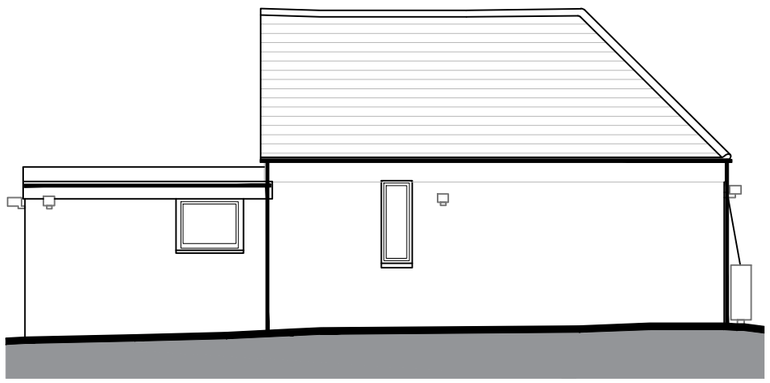
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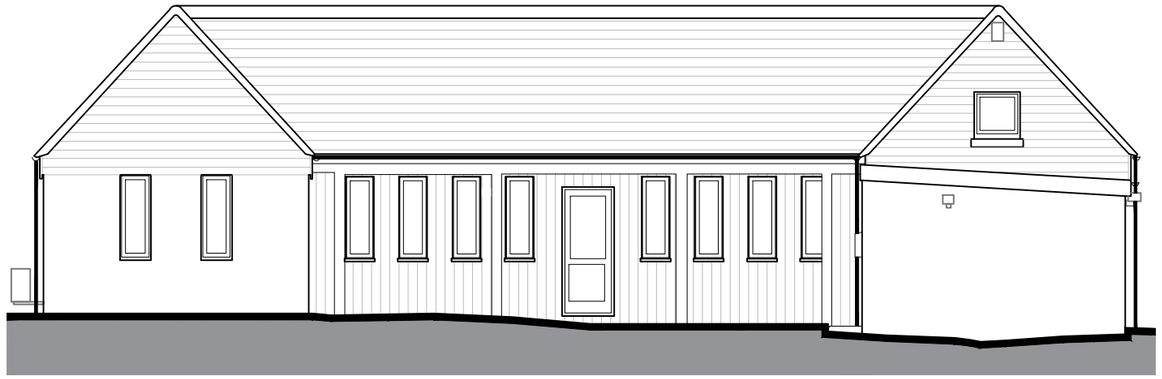
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North Elevation



East Elevation



South Elevation



West Elevation

Client's Name
Antler Homes

Job Title
Land at Crosby Farm, Slinfold

Drawing Title
Existing Elevations - The Old Dairy

Scale
1:100 @ A3

metres 1 2 3 4

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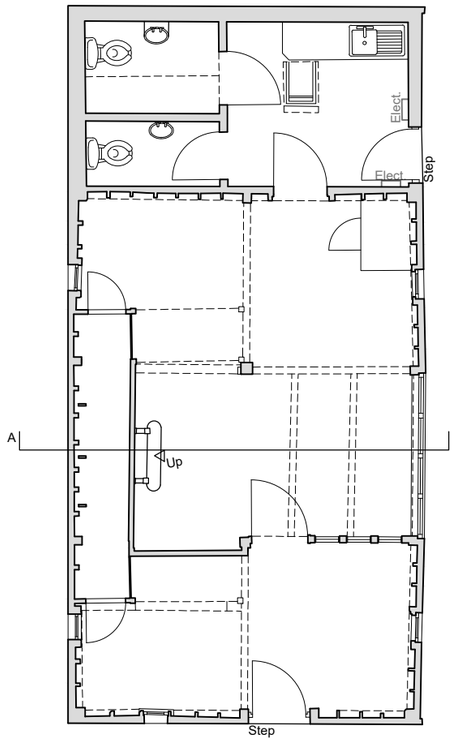
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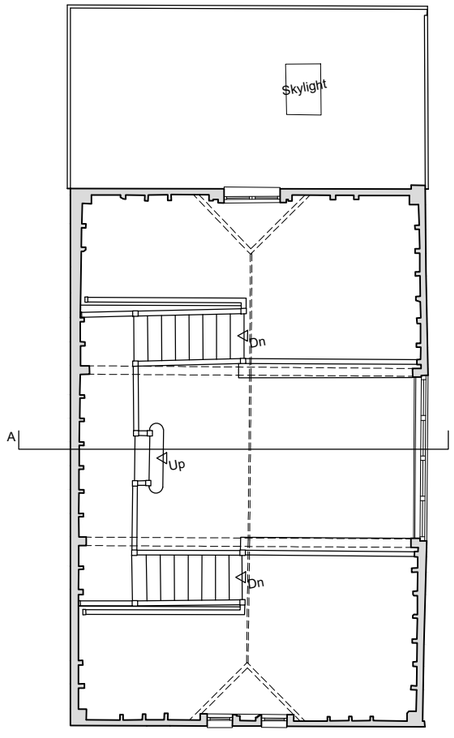
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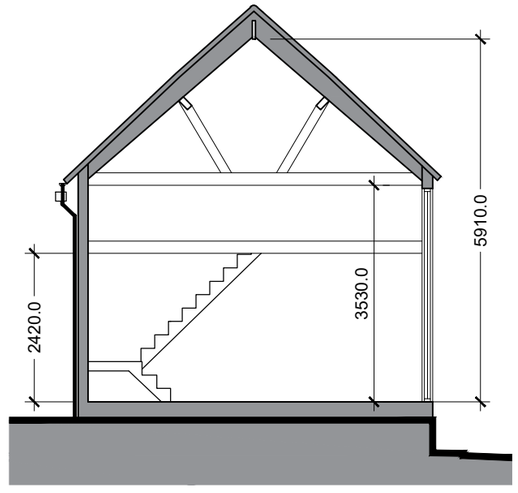
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Existing Ground Floor Plan



Existing First Floor Plan



Section

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Client's Name
Antler Homes

Job Title
Land at Crosby Farm, Slinfold

Drawing Title
Existing Plans - The Granary

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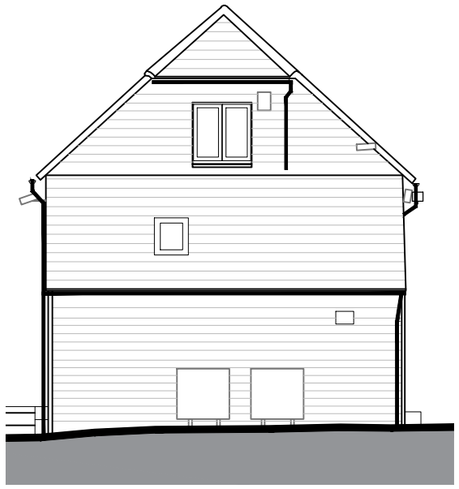
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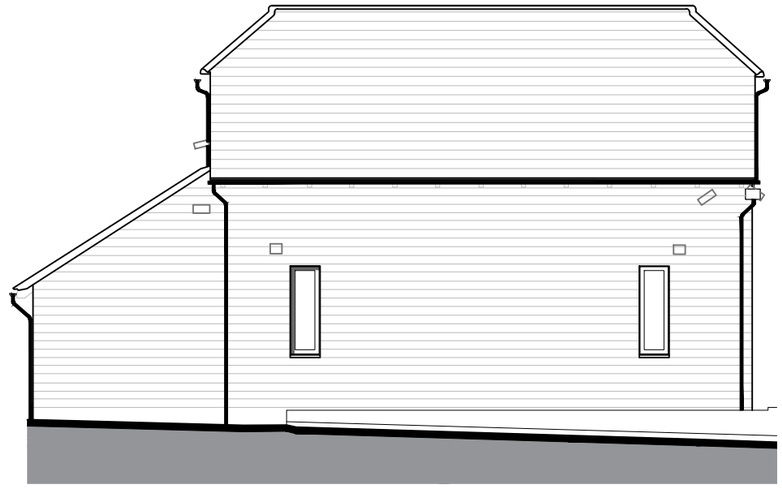
North Elevation



East Elevation



South Elevation



West Elevation

Client's Name
Antler Homes

Job Title
Land at Crosby Farm, Slinfold

Drawing Title
Existing Elevations - The Granary

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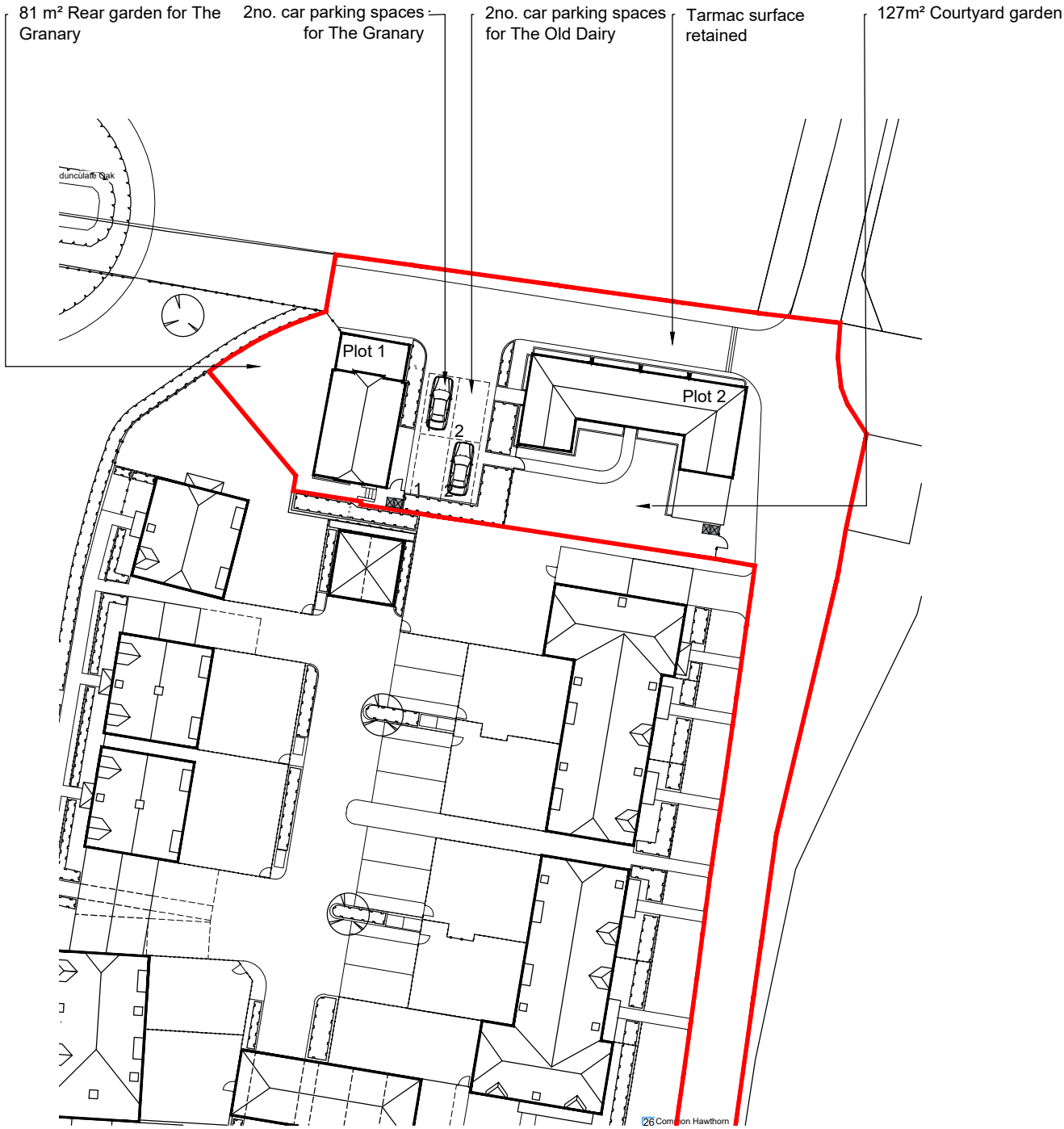
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Appendix D

Proposed Site Plans

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Accommodation Schedule

Plot 1	2-Bedroom House	86.25m²
Plot 2	2-Bedroom House	100.64m²
Total;	**2 Dwellings**	
Car Parking;	2 spaces per Dwelling	

N

Client's Name
Antler Homes

Drawing Title
Proposed Site Plan

Drawn: JT | Checked: SLG | Date: 22.08.22

Job No: 7225 | Drawing No: PL010 | Rev: -

Job Title
Land at Crosby Farm, Slinfold

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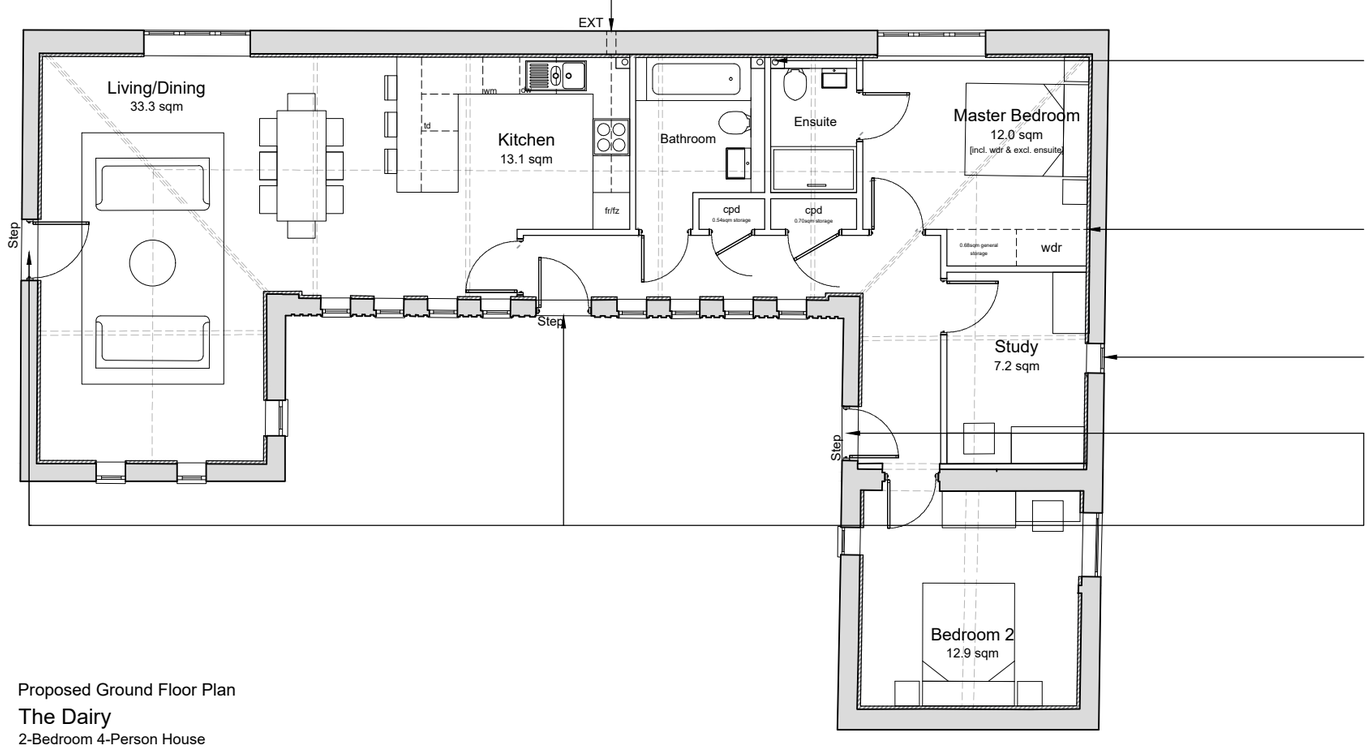
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Hob extract proposed on north elevation of building

New SVP locations in kitchen, bathroom, and ensuite. Connection into existing foul sewer to be confirmed by contractor.

Inner insulated plasterboard skin if required suitable for residential conversion.
SAP consultant to confirm specificiation to achieve U-value complying with Part L1b.

Replacement timber window frames throughout building to match similar appearance of existing to sit within all existing structural openings

Replacement glazed doors throughout building to increase thermal performance.

Proposed Ground Floor Plan

The Dairy

2-Bedroom 4-Person House

100.64 sqm / 1083 sqft GIA [to finishes]

2.0sqm storage provided where shown [2.0sqm required]

Client's Name: Antler Homes

Job Title: Land at Crosby Farm, Slinfold

Drawing Title: Proposed Plans - The Old Dairy

Scale: 1:100 @ A3 (metres 1 2 3 4)

Drawn	Checked	Date
JT	SLG	22.08.22

Job No	Drawing No	Rev
7225	PL026	-

Status: PRELIMINARY

Rev	Date	Revision Details	Dr	Ch

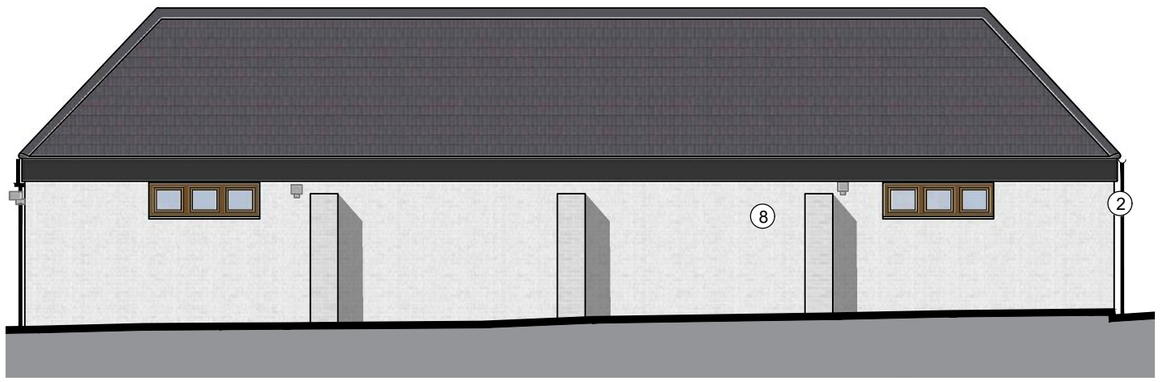
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This information relates only to 'Significant Hazards' identified on this drawing and is to be read in conjunction with the Designer's Hazard Register.



North Elevation



East Elevation



South Elevation



West Elevation

Materials Key:

1 - New brown timber window frames
2 - Black rainwater goods as existing
3 - Black timber weatherboarding as existing
4 - Exposed rafter feet
5 - Timber framed glazed front and side doors
6 - Roof tile as existing
7 - Red Brick as existing
8 - White painted brick as existing
9 - Vertical timber cladding as existing
10 - Black barge board as existing

Client's Name: Antler Homes

Job Title: Land at Crosby Farm, Slinfold

Drawing Title: Proposed Elevations - The Old Dairy

Scale: 1:100 @ A3

metres 1 2 3 4

Drawn	Checked	Date
JT	SLG	22.08.22

Job No	Drawing No	Rev
7225	PL027	-

Status: PRELIMINARY

Rev	Date	Revision Details	Dr	Ch

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N

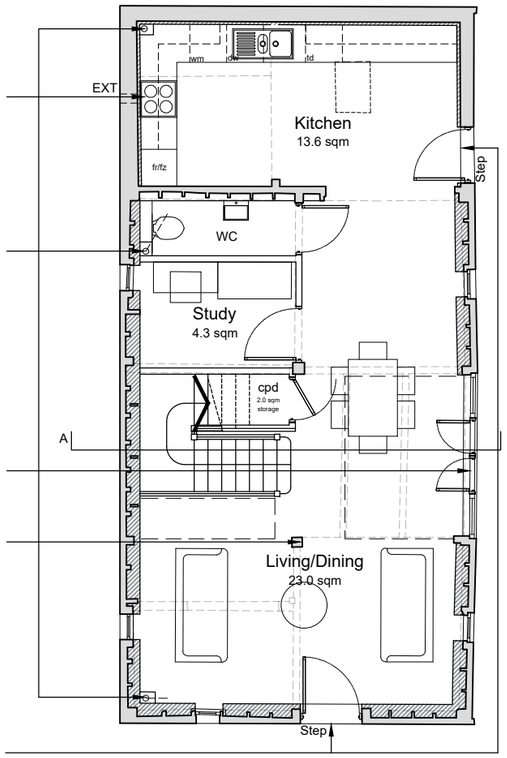
Hob extract proposed on west elevation of building

New SVP locations in kitchen, bathroom, and ensuite. Connection into existing foul sewer to be confirmed by contractor.

Replacement double doors within existing structural opening

Existing posts on ground floor retained

Replacement glazed doors throughout building to increase thermal performance.



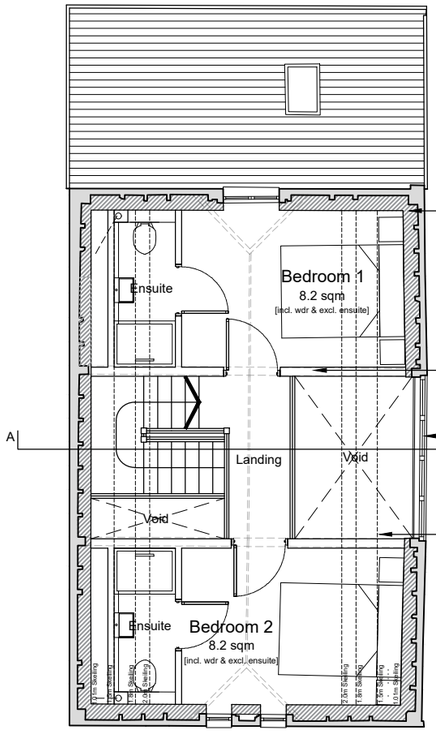
Proposed Ground Floor Plan

The Granary

2-Bedroom 4-Person House

86.25 sqm / 928 sqft GIA [to finishes]

2.0sqm storage provided where shown [2.0sqm required]



Proposed First Floor Plan

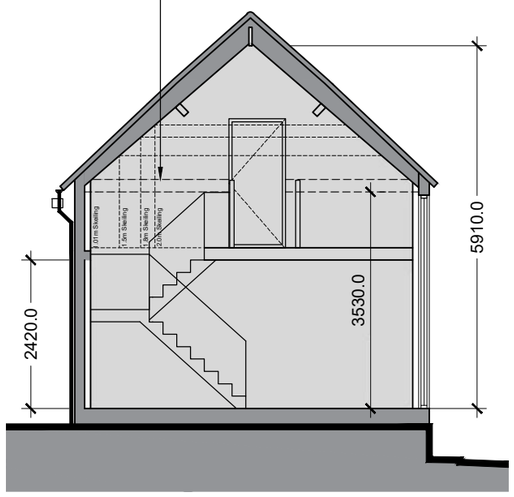
Inner insulated plasterboard skin if required suitable for residential conversion. SAP consultant to confirm specificiation to achieve U-value complying with Part L1b.

Existing roof beam and trusses to be cut to accommodate for new door frame, all to structural engineer design

Replacement timber window frames to improve thermal performance throughout building to match similar appearance of existing to sit within all existing structural openings

Double height space

Existing roof beam and trusses to be cut to accommodate for new door frame, all to structural engineer design



Section

Client's Name: Antler Homes

Job Title: Land at Crosby Farm, Slinfold

Drawing Title: Proposed Plans - The Granary

Scale: 1:100 @ A3 (metres 1 2 3 4)

Drawn	Checked	Date
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Job No	Drawing No	Rev
7225	PL022	-

Status: PRELIMINARY

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North Elevation



East Elevation



South Elevation



West Elevation

Materials Key:

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9 - Vertical timber cladding as existing
10 - Black barge board as existing

Client's Name
Antler Homes

Job Title
Land at Crosby Farm, Slinfold

Drawing Title
Proposed Elevations - The Granary

Scale
1:100 @ A3
metres 1 2 3 4

Drawn	Checked	Date
JT	SLG	22.08.22

Job No	Drawing No	Rev
7225	PL023	-

Status
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Appendix E

Flow Survey: Existing

Residential Flow Survey

Site Name:	**The Old Dairy and The Granary**
Carried Out By:	**Ella Harrop**
Date:	**19th July 2024**

Is the property operating a high or low pressure system?			High/Low
Fixture/Fitting	**Flow/Volume**	**Units**	**Comments**
The Old Dairy			
Kitchen			
- Sink Taps	14	litres/minute	
- Washing Machine		litres/kg dry load	
- Dishwasher		litres/place setting	Brand/Specification
- Water Softener		litres/person/day	Brand/Specification
- Waste Disposal Unit		litres/use	Brand/Specification
Bathroom			
- WC (Single Flush)	14.08	litres	
- WC (Dual Flush)		Full - litres	
		Part - litres	
- Bath		litres (capacity to overflow)	
- Shower		litres/minute	
- Basin Taps	20	litres/minute	
The Granary			
Kitchen			
- Sink Taps	14	litres/minute	
- Washing Machine		litres/kg dry load	
- Dishwasher		litres/place setting	Brand/Specification
- Water Softener		litres/person/day	Brand/Specification
- Waste Disposal Unit		litres/use	Brand/Specification
Bathroom			
- WC (Single Flush)	15.64	litres	
- WC (Dual Flush)		Full - litres	
		Part - litres	
- Bath		litres (capacity to overflow)	
Shower		litres/minute	
- Basin Taps	20	litres/minute	

Appendix F

BREEAM Flow Restriction Calculations

Date: 22/07/2024

Project Name The Old Dairy and The Granary

Floor Size 72m² (The Old Dairy) and 96m² (The Granary)

BREEAM Water Calculation Summary				
	The Old Dairy		The Granary	
Fitting	**Flow Restrictions**	**Remarks**	**Flow Restrictions**	**Remarks**
WC's	14.08 l/flush	28.15 l/person/day	15.64 l/flush	31.28 l/person/day
Wash hand basin	20 l/min	13.54 l/person/day	20 l/min	13.54 l/person/day
Kitchen	14 l/min	6.35 l/person/day	14 l/min	6.35 l/person/day
Fixed Water Use	n/a	1.58 l/person/day	n/a	1.58 l/person/day
Total Demand		**49.62 l/person/day**		**52.75 l/person/day**

BREEAM 2016 International Wat 01 Water consumption calculator - Office buildings

Building details

Building name:	The Old Dairy
BRE Assessment Reference No.	N/A
Precipitation zone:	Please select

Building type	Description of building type	Default occupancy	Default annual days/operation	Default daily hours of operation
Office	Offices and workshop business (including those with a basic (category 1) laboratory area)	7.992	253	10

Main building activity areas	Description of activity area	Activity area present in building?	Net Floor Area (m^2)
Office - Office areas	Cellular or open plan office space, including staff kitchen where present/adjacent and reception areas. Exlcude meeting rooms, visitor waiting or circulation areas.	Yes	72
Office - Small workshop / laboratory space	Small scale workshop or category 1 laboratory area	No	
Office - Staff canteen dining area	Seated dining areas that accompany a permanently staffed kitchen preparing food for consumption on the premises (excludes small un-staffed kitchen's used by office staff to re-heat food, make tea etc.)	No	
Office - Fitness suite/gym (with changing facility and showers)	A fitness suite or gym that is part of the office building/development and used by the building's employees only. The gym will have its own changing facility with showers.	No	

Water Consumption - Building Microcomponent

WC component - all activity areas	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
WC - male (no urinals installed)	Effective flush volume (Litres)		4.00	1.00	0.00
WC - female	Effective flush volume (Litres)	14.08	4.00	1.00	28.15

Urinal component - all activity areas	units	Specification	No. of cisterns	Flushing frequency (flushes/hour)	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Taps components (personal hygiene) - all activity areas					
Wash hand basin taps	Flow rate (litres/min)	20.00	4.00	0.25	13.54
Shower use	Flow rate (litres/min)	0.00	0.030	5.60	0.00
Fixed use - vessel filling	Litres/person/day	-	-	-	1.58
Tap components (cleaning) - staff kitchenette					
Kitchen taps - kitchenette	Flow rate (litres/min)	14.00	1.00	0.67	6.35
Dishwasher	Litres/cycle	0.00	0.04	1.00	0.00
Tap components (cleaning and food preparation) - staff canteen food preparation area					

	Microcomponent Consumption (L/person/day)
Total	49.62

BREEAM 2016 International Wat 01 Water consumption calculator - Office buildings

Building details

Building name:	The Granary
BRE Assessment Reference No.	N/A
Precipitation zone:	Please select

Building type	Description of building type	Default occupancy	Default annual days/operation	Default daily hours of operation
Office	Offices and workshop business (including those with a basic (category 1) laboratory area)	10.656	253	10

Main building activity areas	Description of activity area	Activity area present in building?	Net Floor Area (m^2)
Office - Office areas	Cellular or open plan office space, including staff kitchen where present/adjacent and reception areas. Exlcude meeting rooms, visitor waiting or circulation areas.	Yes	96
Office - Small workshop / laboratory space	Small scale workshop or category 1 laboratory area	No	
Office - Staff canteen dining area	Seated dining areas that accompany a permanently staffed kitchen preparing food for consumption on the premises (excludes small un-staffed kitchen's used by office staff to re-heat food, make tea etc.)	No	
Office - Fitness suite/gym (with changing facility and showers)	A fitness suite or gym that is part of the office building/development and used by the building's employees only. The gym will have its own changing facility with showers.	No	

Water Consumption - Building Microcomponent

WC component - all activity areas	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
WC - male (no urinals installed)	Effective flush volume (Litres)		4.00	1.00	0.00
WC - female	Effective flush volume (Litres)	15.64	4.00	1.00	31.28

Urinal component - all activity areas	units	Specification	No. of cisterns	Flushing frequency (flushes/hour)	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Taps components (personal hygiene) - all activity areas					
Wash hand basin taps	Flow rate (litres/min)	20.00	4.00	0.25	13.54
Shower use	Flow rate (litres/min)	0.00	0.030	5.60	0.00
Fixed use - vessel filling	Litres/person/day	-	-	-	1.58
Tap components (cleaning) - staff kitchenette					
Kitchen taps - kitchenette	Flow rate (litres/min)	14.00	1.00	0.67	6.35
Dishwasher	Litres/cycle	0.00	0.04	1.00	0.00
Tap components (cleaning and food preparation) - staff canteen food preparation area					

	Microcomponent Consumption (L/person/day)
Total	52.75

Appendix G

Existing Water Usage Calculations

Offpat Employment Densities

Units	Area per FTE (m^2)	Floor Area per Unit (m^2)	Total Occupancy
The Old Dairy	12	72	6
The Granary	12	96	8
			14

	The Old Dairy	The Granary
Fixtures	**Water Use (l/p/d)**	**Water Use (l/p/d)**
WC's	28.15	31.28
WHB	13.54	13.54
Kitchen Taps	6.35	6.35
Drinking	1.58	1.58
Totals	49.62	52.75

	Total Water Use (litres per day)				
Performance Levels	**WC's**	**WHB**	**Kitchen Tap**	**Drinking**	**Total**
The Old Dairy	168.90	81.24	38.10	9.48	297.72
The Granary	250.24	108.32	50.80	12.64	422.00
					719.72

Appendix H

Part G Calculation: The Old Dairy

Part G Calculation - Proposed Water Usage

Fixture	Capacity/Flow Rate	Use Factor	Fixed Use	litres/person/ day
WC (Single Flush)		4.42		0.00
WC (Dual Flush)	4	1.46		5.84
WC (Dual Flush) Part	2	2.96		5.92
Taps (excluding kitchen)	2.7	1.58	1.58	5.85
Bath (where shower present)	150	0.11		16.50
Shower (where bath present)	6	4.37		26.22
Bath Only		0.5		0.00
Shower Only		5.6		0.00
Kitchen Sink	4	0.44	10.36	12.12
Washing Machine	6.43	2.1		13.50
Dishwasher	0.99	3.6		3.56
	Total calculated use (litres/person/day)			89.51
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				81.46
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				86.46

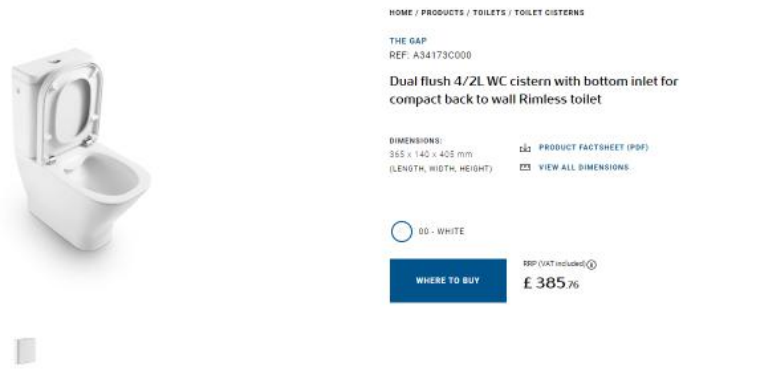
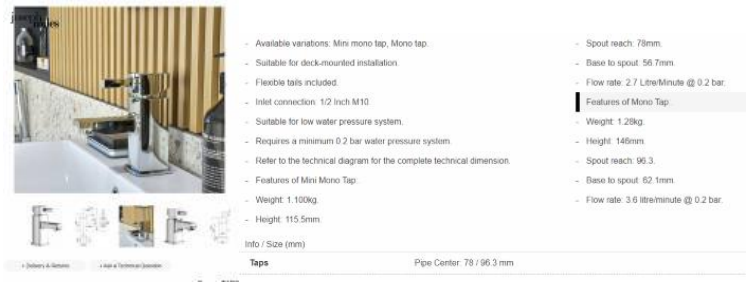
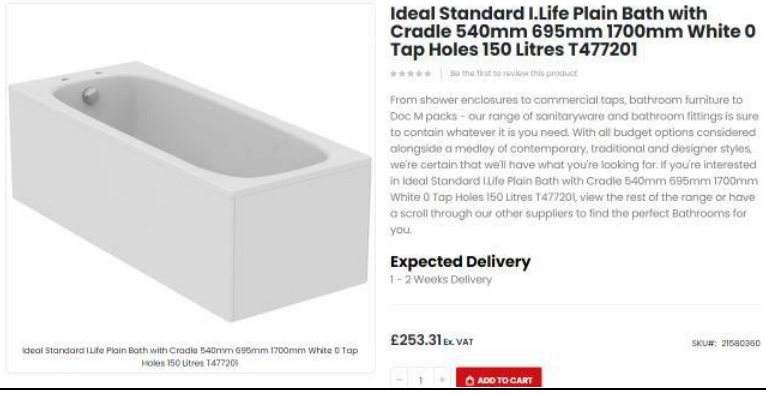
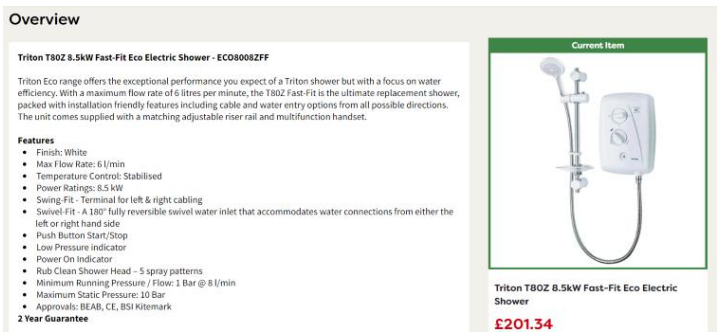
Rainwater Harvesting	27.99	litres/person/day
Mains Water	58.47	litres/person/day
Total	86.46	litres/person/day

	Population	Mains Water Usage	Rainwater Usage	Total Water Usage
The Old Dairy (two-bedrooms)	1.88	109.92	52.62	162.54
Totals	1.88	**109.92**	**52.62**	**162.54**

Appendix I

Fixture and Fittings Specifications

Fixtures and Fittings - Part G Specifications

Item	Capacity/Flow rate	Overview
Toilet (Dual Flush)	4/2 litres	The Gap 
Basin Tap	2.7 litres/minute	Joseph Miles 
Bath	150 litres	Ideal Standard 
Shower	6 litres/minute	Triton 

Kitchen Sink	4 litres/minute	Tap with flow regulator - Affinity by Moores  Utility Chrome utility lever sink mixer tap Tap Height: 380mm Order code: 805 56 Flow Regulator:  • Tap tail type flow limiters are suitable for most Bristan basin, pillar taps, basin and sink mixers. • Operating pressure range – Min. 1.0 bar Max. 5.0 bar. • All flow limiters accurate +/- 10%. • Flow limiting flow straighteners aerates the water for a softer non-splashing flow. • Flow limiting flow straighteners can be easily retro fitted in tap spout (dependent on tap/mixer model). Colour / Flow Rate limited to: / Order Code Pink — 1 litre per minute — 806 37 Olive — 2 litres per minute — 806 38 Brown — 3 litres per minute — 806 39 Grey — 4 litres per minute — 806 40 Yellow — 5 litres per minute — 806 41 Black — 6 litres per minute — 806 42

Appendix J

Part G Calculation: The Granary

Part G Calculation - Proposed Water Usage

Fixture	Capacity/Flow Rate	Use Factor	Fixed Use	litres/person/ day
WC (Single Flush)		4.42		0.00
WC (Dual Flush)	4	1.46		5.84
WC (Dual Flush) Part	2	2.96		5.92
Taps (excluding kitchen)	2.7	1.58	1.58	5.85
Bath (where shower present)		0.11		0.00
Shower (where bath present)		4.37		0.00
Bath Only		0.5		0.00
Shower Only	6	5.6		33.60
Kitchen Sink	4	0.44	10.36	12.12
Washing Machine	6.43	2.1		13.50
Dishwasher	0.99	3.6		3.56
	Total calculated use (litres/person/day)			80.39
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				73.16
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				78.16

Rainwater Harvesting	27.99	litres/person/day
Mains Water	50.17	litres/person/day
Total	78.16	litres/person/day

	Population	Mains Water Usage	Rainwater Usage	Total Water Usage
The Granary (two-bedrooms)	1.88	94.32	52.62	146.94
Totals	1.88	**94.32**	**52.62**	**146.94**

Appendix K

Rainwater Harvesting Calculations

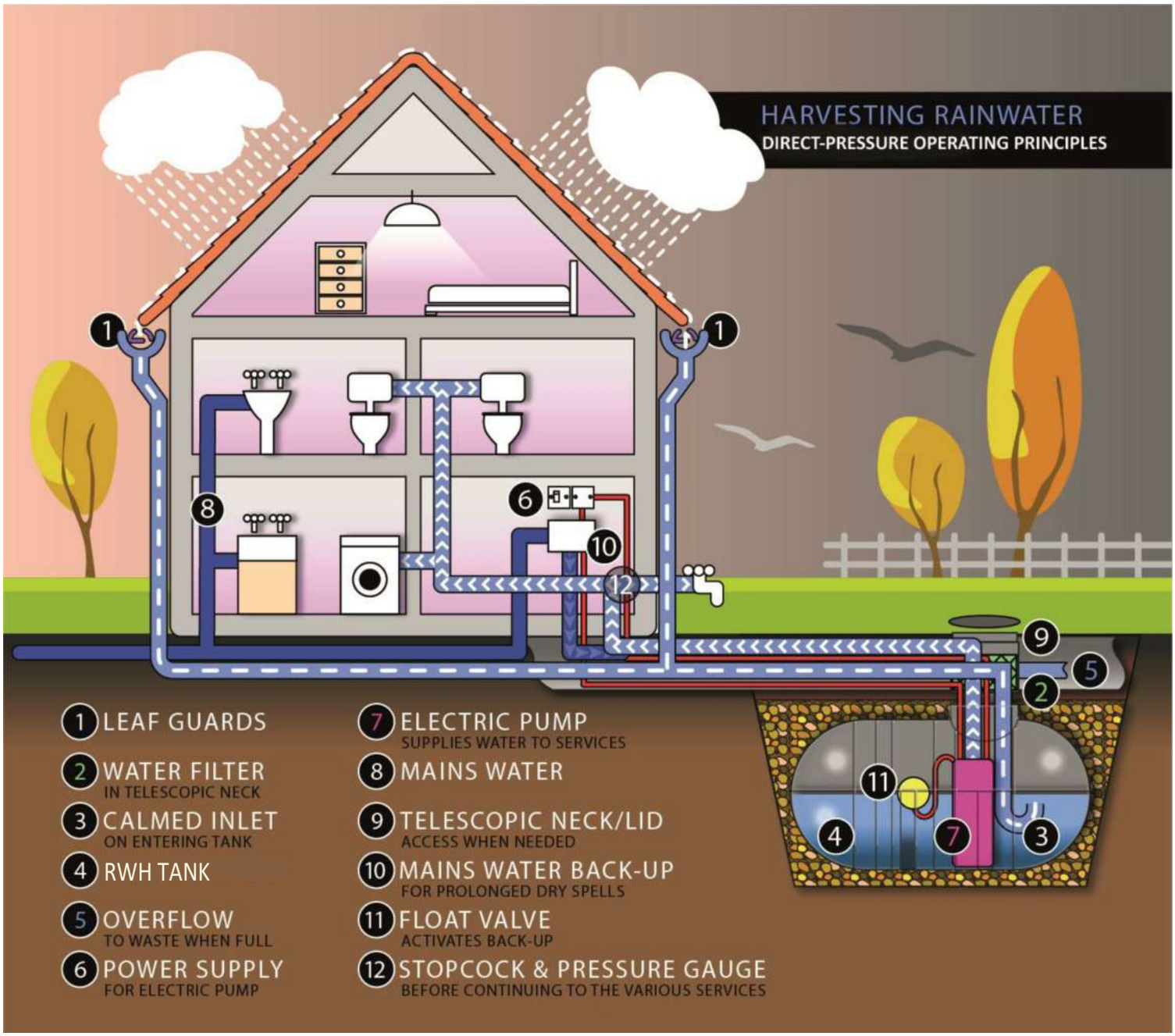
Rainwater Harvesting System (BS EN 16941-1:2018 - Intermediate Approach)

AAR	858.7	Average Annual Rainfall
e	0.8	Yield Coefficient
h	0.9	Hydraulic Filter Efficiency
P_d	27.99	Daily Requirement per Person

Unit	Type	No. Beds	No. Units	Census	Population	Roof Area (m2)	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank Size (litres)
The Old Dairy	House	2	1	1.88	1.88	105	6,232	1,844	2,600
The Granary	House	2	1	1.88	1.88	68	4,036	1,844	2,600
		Totals	2		3.76		10,268.13	3,687.69	

Appendix L

Rainwater Harvesting System Specifications


HARVESTING RAINWATER
DIRECT-PRESSURE OPERATING PRINCIPLES
1 LEAF GUARDS
2 WATER FILTER
IN TELESCOPIC NECK
3 CALMED INLET
ON ENTERING TANK
4 RWH TANK
5 OVERFLOW
TO WASTE WHEN FULL
6 POWER SUPPLY
FOR ELECTRIC PUMP
7 ELECTRIC PUMP
SUPPLIES WATER TO SERVICES
8 MAINS WATER
9 TELESCOPIC NECK/LID
ACCESS WHEN NEEDED
10 MAINS WATER BACK-UP
FOR PROLONGED DRY SPELLS
11 FLOAT VALVE
ACTIVATES BACK-UP
12 STOPCOCK & PRESSURE GAUGE
BEFORE CONTINUING TO THE VARIOUS SERVICES

SDS

Water Infrastructure Systems

DIRECT PRESSURE SYSTEM HOME & GARDEN





Inside the Household

Top Up Controller

Automatic mains water top-up Controller kit for rainwater tanks with pump isolation and alarm. The system detects when the tank contents level is running low and initiates a mains top up procedure to ensure the tank never runs out of water supply.

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE

T: +44 (0)1934 751303
E: info@sdslimited.com

SDS
Water Infrastructure Systems

SYSTEM:

A Direct Pressure System is the most popular, cost effective and risk-free option for rainwater harvesting. It can be used for both garden and household applications, for example, it can be used in buildings with a small block of toilets, and for garden irrigation and machine washdowns. The system sends pressurised water straight from the external tank directly to the application. If the water level in the tank gets too low, the top up controller will activate a mains top up so the tank doesn't empty.

COMPONENTS

P Series pumps are stainless steel pumps with plastic coverings and are suitable for domestic water systems, rainwater harvesting, tanks, surface irrigation and tank transfer.

The rodent guard protects the internal water from rodents and large debris which could contaminate the water entering via the overflow.

The PF filter is designed with a level drop, this along with its very smooth surface structure allows excess dirt to be rinsed straight through to the overflow. The filter cartridge mesh is stainless steel within plastic housing and is self-cleaning, though regular inspection is recommended.

The calmed inlet removes the kinetic energy from the water as it enters the tank. This means that as the water enters it doesn't stir up the contents of the tank.

The turret set provides the connection between the pump and the pipework leading to the various external applications. They are made from a flexible plastic so can easily deal with the pressurised water coming from the pump.

The pump lifting chain aids in servicing the pump as it allows the pump to be easily pulled up towards the top of the tank.

A floating intake ensures that no water from either the bottom or the surface of the tank is taken in. Meaning only clean water passes through the system and is pumped into the household.

ADDITIONAL SPECIFICATIONS

- Service duct
- Delivery hose (Options available)
- Top up controller
- Tanks sold separately
- Extra overflow on tanks 5600 – 10000

POPULAR USE:

- Garden irrigation
- Cleaning the car
- Washing windows
- Power washing drive/patio
- Outside tap and hosepipe
- Flushing toilets
- Drinking water (if tank is potable)
- Washing machine





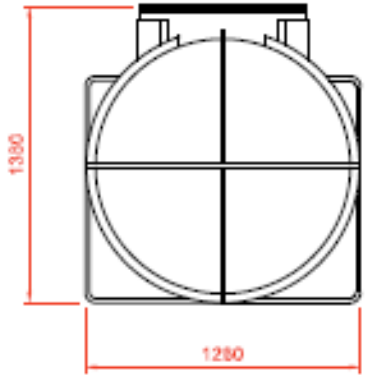
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Appendix M

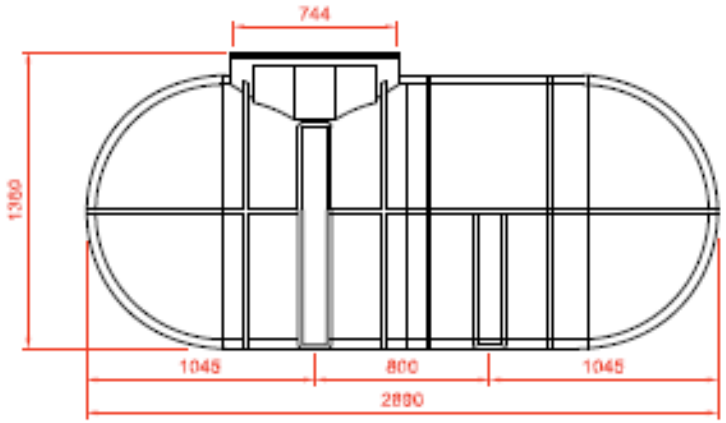
Rainwater Harvesting Tank Size Dimensions

SDS 2,600 Litre Rainwater Harvesting Tank

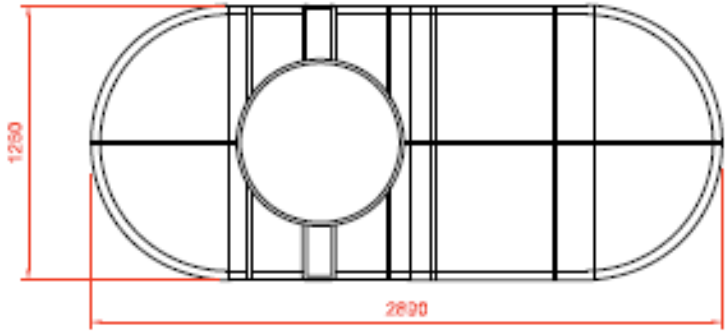




END ELEVATION



SIDE ELEVATION



PLAN

Client	SDS	Details
Project Name	2,600 Litre Tank	
Type	Standard Detail	
Date	-	
Drawing no.	-	
Revision	A	

Notes:

This Drawing is to be read in conjunction with all relevant Architect, Engineers and Specialists drawings and specifications.

Do not scale from the drawing in either paper or digital form. Use written dimensions only.

SDS Water Infrastructure Systems

Appendix N

Rainwater Harvesting Management and Maintenance Plan

Land at Crosby Farm
Lyons Road, Slinfold

Rainwater Harvesting Management and Maintenance Plan

For

Antler Homes

motion

Document Control Sheet

Land at Crosby Farm

Lyons Road, Slinfold

Antler Homes

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
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3.0 Water Quality Control 3
4.0 Continuity of Supply 4
5.0 Maintenance Categories 5
6.0 The Rainwater Harvesting System 6
7.0 General Maintenance Principles 7
8.0 Inspection and Maintenance Frequency of Components 8

1.0 Introduction

1.1 The report sets out the principles for the long-term management and maintenance of the rainwater harvesting systems at the proposed development.

1.2 The purpose of this report is to ensure that the client has a robust inspection and maintenance plan for the lifetime of the development. This will ensure the optimum operation of the rainwater harvesting systems and that they will be continually maintained. This will ensure that the proposed development will remain water neutral.

1.3 All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be undertaken and made available, if requested.

1.4 This report has been produced by Motion to describe the typical management and maintenance tasks that are known at the design stage (such as maintenance frequencies and typical tasks). These have been drawn from industry guidance such as BS EN 16941-1:2018, The SuDS Manual (CIRIA 753) and the manufacturer's own guidance.

1.5 Maintenance is considered as a construction activity under the CDM Regulations 2015. Under the CDM Regulations, it is a requirement that a competent person be appointed to carry out a required role. CDM defines a competent person as an individual with sufficient knowledge of the specific tasks to be undertaken, as well as sufficient experience and ability to carry out their duties in relation to the task in a way that secures health and safety on site.

1.6 In recognition of the requirements of the CDM Regulations 2015, this rainwater harvesting management and maintenance plan expects that the maintenance work will be carried out by a competent person who must have prior knowledge of the rainwater harvesting systems onsite.

2.0 Treatment

2.1 The rainwater harvesting system shall incorporate suitable treatment in accordance with BS EN 16941-1:2018, to ensure that the water quality is suitable for its intended end use.

2.2 The treatment will cover the following:

- Removal of coarse particles, upstream of the storage;
- Retention of fine particles by sedimentation and flotation in the storage tank; and
- Filtration following the storage device, depending on the intended use.

2.3 Preliminary treatment will be provided in the form of filters and separators prior to the storage tank. This will include leaf guards on gutters and a leaf filter. A first flush diverter will be included to divert particles contained in rainwater away from the tank and to a suitable drain. These measures will prevent coarse solids and organic matter from entering the storage tank.

2.4 Any fine particles will then be separated either by sedimentation by settling out to the bottom of the tank, or flotation to the water surface.

2.5 A calmed inlet will be incorporated in the tank to prevent turbation of the sediment at the bottom of the tank by the inflow of water. Removal of the sediment will be carried out in accordance with Table 5.1 below.

2.6 Removal of floating particles will occur when the tank overflows, or when it is cleaned out in accordance with Table 5.1 below.

2.7 Water will be extracted from the tank via a floating pump, which will extract water from level that is above any sediment collected at the bottom of the tank and below any floating particles. This will help maintain the quality of harvested rainwater that is to be used in the property.

2.8 Where the water is being used for laundry, it is understood that the Council require an additional level of treatment. Therefore, it is proposed that a UV filter will be incorporated in advance of the washing machine and this will kill any microorganisms, prior to it being used in the washing machine.

2.9 A schematic showing the layout of the equipment used in a rainwater harvesting system is shown in Figure B.2 of BS EN 16941-1:2018.

3.0 Water Quality Control

3.1 It is understood that the system will be considered as a private water supply and, therefore, will be governed by the Private Water Supply Regulations 2016. These are regulated by the local council's Environmental Health Officer or Pollution Control Officer. However, the regulations in England and Wales do not require monitoring to be undertaken where the water supply is to a single domestic dwelling, unless the local authority is requested to do so by the owner or occupier of the dwelling, or if they are concerned that the supply presents a potential danger to human health.

3.2 NA.1 in BS EN 16941-1:2018 states that frequent testing should not normally be required for rainwater harvesting systems to ensure the water quality. It states that observations for water quality should be made during maintenance visits and testing should be carried out where the system is not operating satisfactorily. When sampling is required a sample should be taken and carried out in accordance with the guidance set out in NA.1 and Table NA.1 sets out the guideline values for bacteriological monitoring and Table NA.2 for non-bacteriological monitoring.

3.3 The water quality will need to be maintained at a suitable level commensurate with the end use and the treated water quality will have to meet those set out in the Private Water Supply Regulations.

4.0 Continuity of Supply

4.1 To ensure that sufficient water is available for re-use, the storage tank will be sized so that it can provide 35 days of storage, which will provide sufficient supply during periods of drought.

4.2 Where drought periods extend beyond 35 days, the rainwater harvesting system will include an automatic mains backup. This will ensure that water is available at all times, even during extended periods of drought.

5.0 Maintenance Categories

5.1 There are three categories of maintenance activities referred to in this report. These are:

Inspection and Monitoring

- Inspection and monitoring tasks should be carried out frequently, nominally once a month, and should include a visual inspection of all components including all inlets and outlets.

Regular Maintenance (Monthly)

- Regular maintenance consists of basic tasks done on a frequent and predictable schedule.

Seasonal Maintenance (Quarterly)

- Seasonal maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks.

Remedial Maintenance

- Remedial maintenance comprises of intermittent tasks that may be required to rectify faults associated with the system that have been identified through visual inspections. The likelihood of faults can be minimised by correct installation, regular inspection and timely maintenance.

6.0 The Rainwater Harvesting System

6.1 The proposed rainwater harvesting system will receive rainwater passing through and over several structures and will store rainwater within several items of infrastructure. These include:

- Roofs
- Gutters
- Filters;
- Pumps;
- Overflows; and
- Storage tanks.

6.2 All components should be installed in accordance with the manufacturer's instructions and to the levels/arrangements as defined on the designer's drawings.

6.3 This report should be read in conjunction with the rainwater harvesting design, so that the location and type of each item of infrastructure can be recognised and understood.

6.4 Manufacturer's instructions are to be added to this document once specific products have been selected and installed as part of the detailed design. This document will subsequently form the basis for a maintenance regime for the rainwater harvesting system.

7.0 General Maintenance Principles

7.1 All rainwater harvesting systems require regular maintenance to keep them working at optimum efficiency and capacity. The maintenance of the rainwater harvesting systems should be carried out alongside other regular maintenance tasks within the property.

7.2 Timely and adequate maintenance will increase the lifespan of the rainwater harvesting system. Inadequate maintenance will do the reverse.

7.3 The property owners are responsible for the monitoring and maintenance of the rainwater harvesting system for the lifetime of the development.

8.0 Inspection and Maintenance Frequency of Components

8.1 Table 5.1 below lists each of the components used within the development's rainwater harvesting systems. It suggests an indicative maintenance frequency for each component and ascribes typical maintenance tasks to them.

8.2 In accordance with the Drinking Water Inspectorate's Private Water Supply regulations, it is the responsibility of the homeowner to ensure that all necessary maintenance activities are carried out in a timely manner and that the design performance of each drainage component is preserved. The homeowner may appoint a competent contractor to assist with the maintenance of their rainwater harvesting system. Additionally, the Council has a role to ensure the regulations are upheld by the homeowner.

8.3 If there is any uncertainty regarding the correct and safe methods of cleaning, or what equipment should be used, the manufacturer should be consulted.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspection of the tank for debris and sediment build-up	Annually
	Inspection of inlets/outlets and withdrawal devices	Annually
	Inspection of filters	Annually
	Inspection of Pumps	Annually
	Inspection of overflow areas	Annually
	Inspection of gutters	Annually
	Cleaning of tank	Annually
	Cleaning of inlets and outlets and withdrawal devices	Annually
	Cleaning of gutters and roof drain filters	Annually
	Check pump operation	Annually
Occasional Maintenance	Cleaning and/or replacement of any filters	Quarterly
Remedial Actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 5.1 – Maintenance tasks and frequencies

8.4 Upon completion of maintenance activities, a record should be kept of the work carried out. This should be retained and an annual maintenance report should be compiled, which should include the following:

- Observations resulting from inspections;
- Maintenance and operation activities undertaken during the year; and

- Recommendations for inspections and maintenance programmes for the following year.

8.5 On the next page is a table with suggested information that should be recorded and included with the maintenance plan. As mentioned in the introduction to this document, this should be a living document and regularly updated, as required and should be kept for the lifetime of the development.

Date	Component requiring maintenance	Issues prompting maintenance	Scheduled maintenance (Y/N)	Maintenance carried out	Additional works required (Y/N). If yes, please detail	Next scheduled date of inspection and maintenance