Technical Note 2: Water Neutrality Statement

Site: Broadview, Broadbridge Heath
Prepared by: Leo Lovett
Approved by: Neil Jaques
Date: 12 February 2025

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1.0 Introduction

1.1 This Water Neutrality Statement (WNS) has been prepared on behalf of Silverlake Care 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) it is understood that Horsham District Council require all new and reserved matter planning applications 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 supply area 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 Guildford Road (A281) to the east of Broadbridge Heath (RH12 3PQ).

2.2 The existing site is currently a five-bedroom dwelling (Broadview) with an outbuilding to the rear. A copy of the existing site plans can be found in **Appendix C**.

2.3 The proposal is to convert the existing residential dwelling to provide six residential bedspaces for students with special education needs. In addition to this, the outbuilding to the rear of the property will be converted to provide an area for staff. The staff will not be living at Broadview, and will instead work shifts at the property. A copy of the proposed site plans can be found in **Appendix D**.

3.0 Baseline Calculations

3.1 The existing site is currently a five-bedroom dwelling.

3.2 The five-bedroom dwelling is not currently occupied. Therefore, census data has been used to estimate the average population in the property, which is 3.09 for a five-bedroom dwelling.

3.3 A flow survey was undertaken in January 2025 to determine the existing water usage of the site. A copy of the flow surveys can be found in **Appendix E**.

3.4 A Part G calculation following the flow survey on Broadview gives a water consumption of 155.57 litres per person per day, which equates to 480.70 litres per day for the five-bedroom dwelling with an average population of 3.09. A copy of the Part G calculations can be found in **Appendix F**.

3.5 It is proposed to convert Broadview into bedspaces for students with special education needs. Therefore, there will be 480.70 litres per day spare mains water capacity for the proposed development of the site.

4.0 Additional Demand

4.1 The proposal is to convert the existing residential dwelling to provide six residential bedspaces for students with special education needs.

4.2 There will be one student per bedroom, therefore Broadview will have a population of six students.

4.3 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that the proposed development will achieve a water consumption of 84.45 litres per person per day, which includes an allowance of 5 litres per day for external water usage. A copy of the Part G calculation can be found in **Appendix G** and is summarised in Table 4.1, below:

	Total Water Usage (l/p/day)	Mains Water Usage (l/p/day)	Rainwater Usage (l/p/day)
WC (full flush)	5.84		5.84
WC (part flush)	5.92		5.92
Taps (excluding kitchen)	5.85	5.85	
Bath	14.30	14.30	
Shower	26.22	26.22	
Kitchen Taps	12.12	12.12	
Washing Machine	13.50		13.50
Dishwasher	3.56	3.56	
Total	87.31	62.05	25.26
Normalisation Factor	0.91	0.91	0.91
Total	79.45	56.47	22.99
External Water Use	5.00		5.00
Total	84.45	56.47	27.99

Table 4.1 – Proposed water usage

4.4 A copy of the proposed fixtures and fittings to achieve the above water consumption can be found in **Appendix H**.

4.5 There will be 8 members of staff each day, six of which will work an 8 hour shift and 2 will work a ten hour shift. This equates to sixty-eight hours in total each day.

4.6 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that the staff will achieve a water consumption of 1.47 litres per staff member per hour, which includes an allowance of 0.21 litres per hour for external water usage. A copy of the Part G calculation can be found in **Appendix G** and is summarised in Table 4.2, below:

	Total Water Usage (l/p/day)	Mains Water Usage (l/p/day)	Rainwater Usage (l/p/day)
WC (full flush)	5.84		5.84
WC (part flush)	5.92		5.92
Taps (excluding kitchen)	5.85	5.85	
Kitchen Taps	12.12	12.12	
Dishwasher	3.56	3.56	
Total	33.29	21.53	11.76
Normalisation Factor	0.91	0.91	0.91
Total	30.29	19.59	10.70
External Water Use	5.00		5.00
Total	35.29	19.59	15.70
Days to Hours	/24	/24	/24
Total	1.47	0.82	0.65

Table 4.2 – Proposed water usage

4.7 As the staff will work a combined total of 68 hours each day, the water usage of the staff per day will be 100.00 litres per day.

4.8 Using the Part G water consumption figure of 84.45 litres per person per day and a total population of six and the total of 68 hours of staff present equating to 100.00 per day, it is estimated that the water usage per day for the proposed development is 606.73 litres per day. This is 126.03 litres per day greater than the baseline water usage of 480.70 litres per day. At this stage, the development cannot be considered to be water neutral.

4.9 Therefore, to achieve water neutrality, it is necessary to reduce mains water consumption further through rainwater harvesting and recycling, which is discussed further in section 5 below.

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.

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

5.3 Noting the water use, Table 4.1 above confirms that 27.99 litres per person per day, and Table 4.2 above which confirms that 0.65 per staff member per hour can be supplied by the rainwater harvesting system, which equates to 212.43 litres per day based on a population of six students and a combined total of 68 hours of staff working each day.

5.4 The size of the rainwater harvesting tank for the site has 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.

5.5 The roof material of the property is clay tiles and therefore a conservative yield of 0.8 has been used in the calculations.

5.6 A total roof area of 297m^2 is available for rain water harvesting, however a minimum of 130m^2 can be used to get enough yield to meet the demand of the property.

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

Unit	Total Population	Roof Area (m^2)	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank Size (litres)
Broadview	6	130	7,491	7,443	6,800

Table 5.1 – Rainwater Harvesting Sizing Calculations

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

5.9 The dimensions of the proposed tanks can be found in **Appendix K**.

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

5.11 Once rainwater harvesting has been incorporated into the site the mains water usage will be reduced to 56.47 litres per person per day, which equates to 338.79 litres per day, based on a population of eight students.

5.12 Staff mains water usage per day will remain the same value, so the combined total of the students and staff mains water usage will be 394.30.

5.13 Therefore, following the incorporation of the above measures the proposed water use will be 394.30 litres per day, which is 86.40 litres per day less than the spare capacity created from the existing water usage of 480.70 litres per day.

6.0 Offsetting Demand

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 sets out the water usage strategy for the proposed development at the Broadview, Guildford Road, Broadbridge Heath.

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

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

7.4 This strategy will ensure that the new development will have a neutral impact on the SNWSZ. The Water Usage Strategy confirms the proposal will be water neutral once complete and therefore satisfies Natural England's requirements.

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.

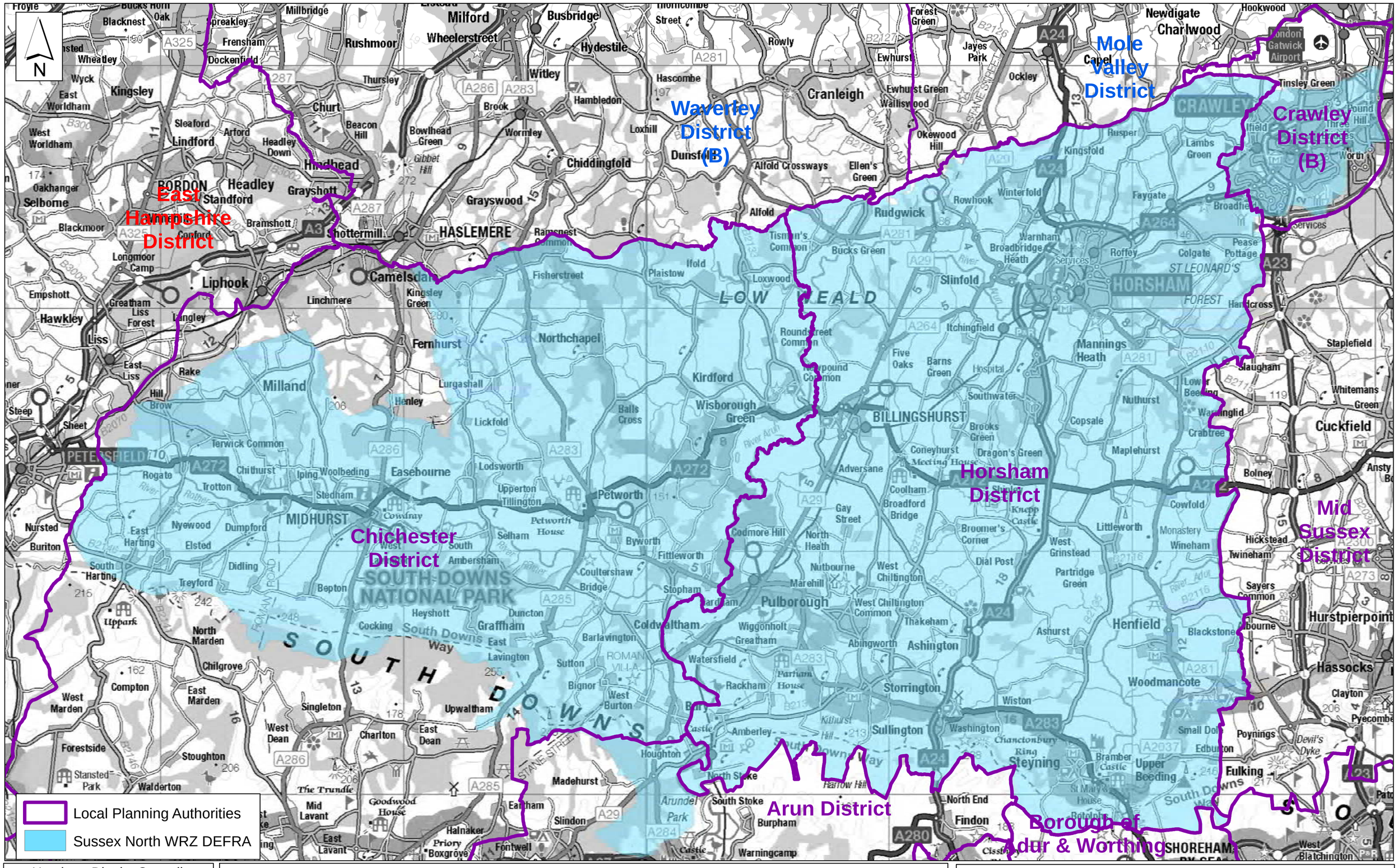
If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

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



Horsham District Council

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

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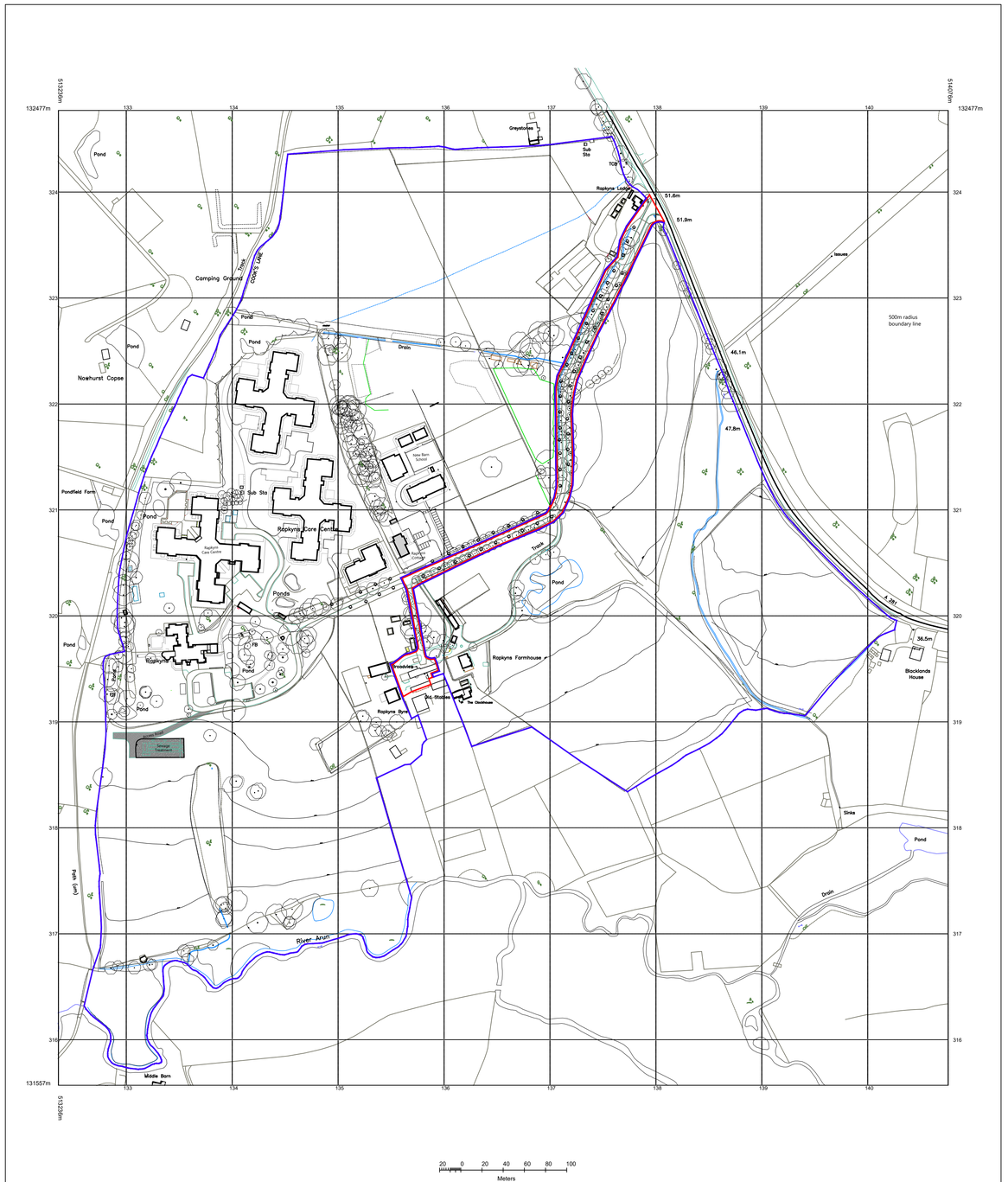
Sussex North Water Resource Zone

Chichester Horsham Crawley

Reference No :		Date : 23 November 2021	Scale : 1:3,000 at A2
Drawing No:	Drawn :	Checked :	Revisions :

Appendix C

Existing Site Plans



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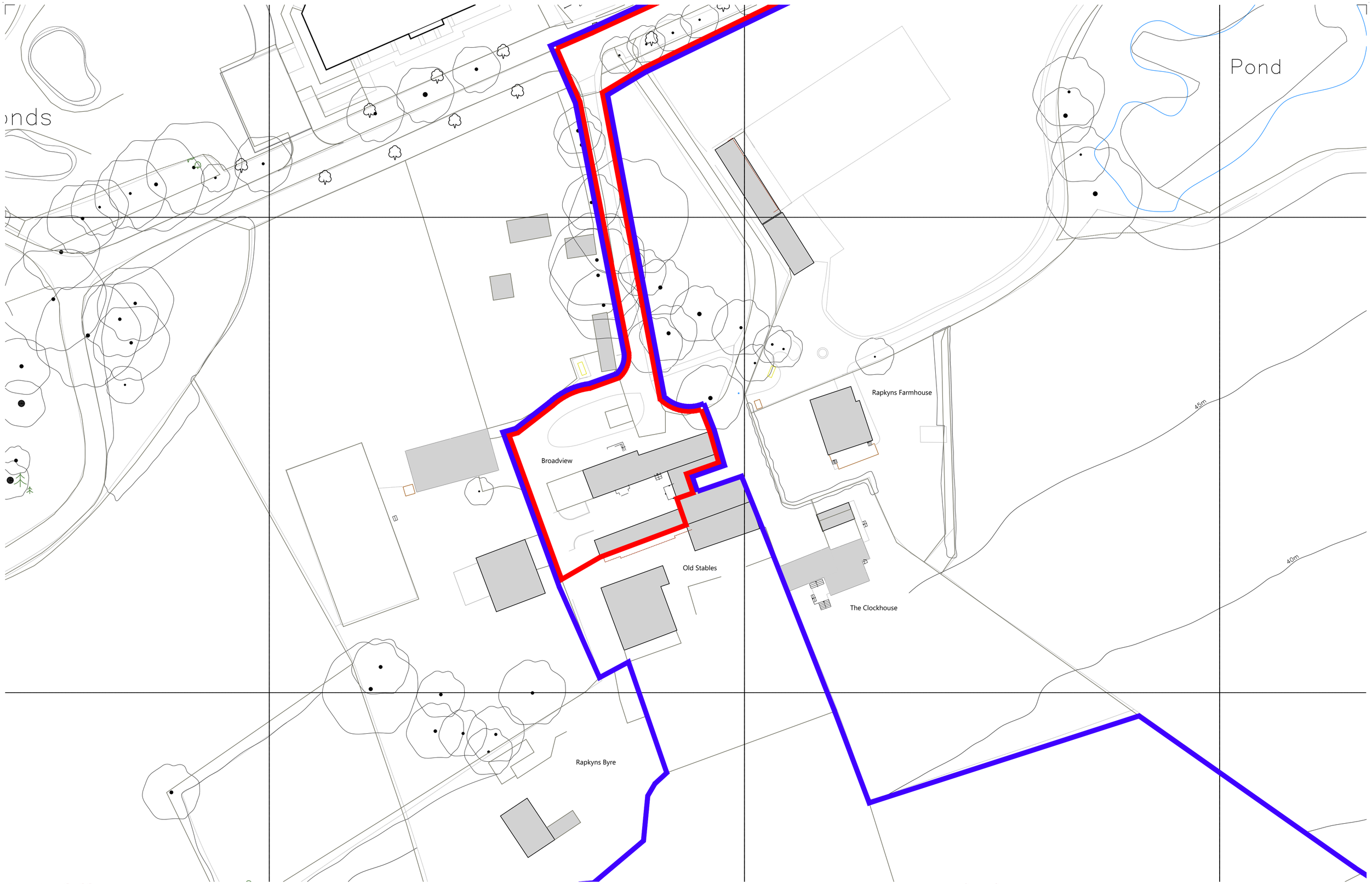
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PROJECT: Broadview

TITLE: Existing Location Plan
Broadview

DRAWING NUMBER: 2119_001

REV: --



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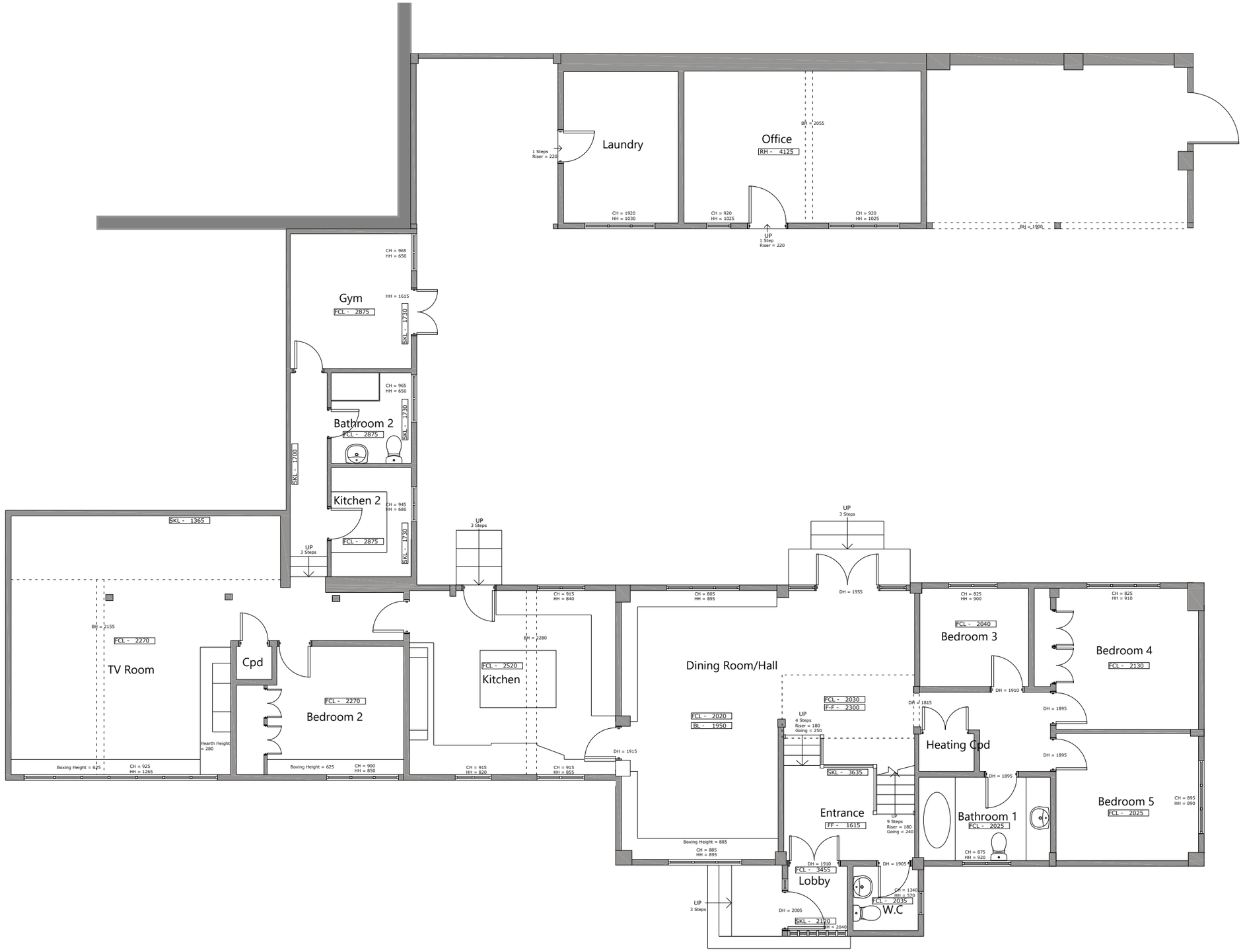
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0 5 10 15 20 25m
SCALE 1:500 @ A2

CLIENT: New Barn School
PROJECT: Broadview
TITLE: Existing Block Plan
DRAWING NUMBER: 2119_003
REV:



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CLIENT: New Barn School

PROJECT: Broadview

TITLE: Existing Ground Floor Plan

DRAWING NUMBER: 2119_005

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PROJECT: Broadview

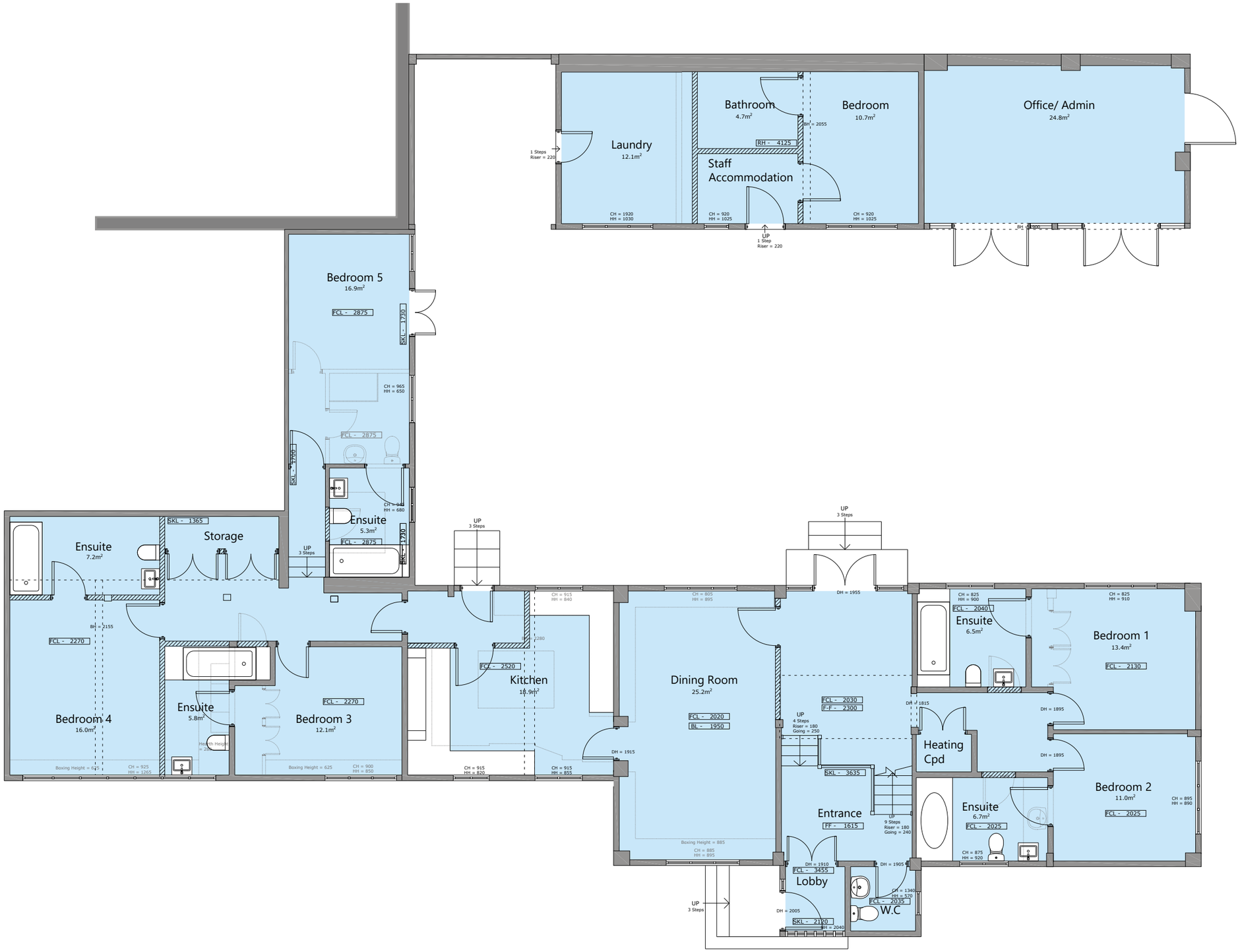
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DRAWING NUMBER: 2119_006

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Appendix D

Proposed Site Plans



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SCALE 1:100 @ A3

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CLIENT: New Barn School

PROJECT: Broadview

TITLE: Proposed Ground Floor Plan

DRAWING NUMBER: 2119_010

REV: --



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CLIENT: New Barn School

PROJECT: Broadview

TITLE: Proposed First Floor Plan

DRAWING NUMBER: 2119_011

REV: --

Appendix E

Flow Surveys

Residential Flow Survey

Site Name:	**Broadview**
Carried Out By:	**Laura Jagiela and Leo Lovett**
Date:	**21/01/2025**

Is the property operating a high or low pressure system?			High/Low
Fixture/Fitting	**Flow/Volume**	**Units**	**Comments**
Kitchen			
- Sink Taps	10	litres/minute	
- Washing Machine	7.14	litres/kg dry load	Logik L7W5D18 7Kg Washer Dryer
- Dishwasher	1.54	litres/place setting	Bosch SGV4313GB/13 Dishwasher
- Water Softener		litres/person/day	Brand/Specification
- Waste Disposal Unit		litres/use	Brand/Specification
Utility Room			
- Washing Machine		litres/kg dry load	Brand/Specification
- Sink Taps	14	litres/minute	
Family Bathroom			
- WC (Single Flush)		litres	
- WC (Dual Flush)	8.349	Full - litres	
		Part - litres	
- Bath	208.8	litres (capacity to overflow)	
- Shower		litres/minute	
- Basin Taps	16	litres/minute	
Ensuite			
- WC (Single Flush)		litres	
- WC (Dual Flush)	16.32	Full - litres	
		Part - litres	
- Bath	327.36	litres (capacity to overflow)	
- Shower	5.8	litres/minute	
- Basin Taps	9	litres/minute	
Cloakroom			
- WC (Single Flush)	14.241	litres	
- WC (Dual Flush)		Full - litres	
		Part - litres	
- Basin Taps	22	litres/minute	
Other			
- Shower	11.2	litres/minute	
-			
- Office Tap			

Appendix F

Part G Calculation: Flow Surveys

Part G Calculation - Broadview Water Usage (Flow Survey)

Broadview

Fixture	Capacity/Flow Rate	Use Factor	Fixed Use	litres/person/ day
WC (Single Flush)		4.42		0.00
WC (Dual Flush)	12.34	1.46		18.01
WC (Dual Flush) Part	6.17	2.96		18.26
Taps (excluding kitchen)	15.67	1.58	1.58	26.33
Bath (where shower present)	268.5	0.11		29.54
Shower (where bath present)	8.5	4.37		37.15
Bath Only		0.5		0.00
Shower Only		5.6		0.00
Kitchen Sink	12	0.44	10.36	15.64
Washing Machine	7.14	2.1		14.99
Dishwasher	1.54	3.6		5.54
	Total calculated use (litres/person/day)			165.46
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				150.57
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				155.57

	Population	Total Water Usage
5-Bedroom	3.09	480.70
Totals	3.09	480.70

Appendix G

Part G Calculation: Proposed

Part G Calculation - Proposed Water Usage

Broadview

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)	130	0.11		14.30
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)			87.31
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				79.45
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				84.45

Rainwater Harvesting	27.99	litres/person/day
Mains Water	56.47	litres/person/day
Total	84.45	litres/person/day

	Population	Mains Water Usage	Rainwater Usage	Total Water Usage
Broadview	6	338.79	167.94	506.73
Totals	6	**338.79**	**167.94**	506.73

Part G Calculation - Proposed Water Usage

Staff

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		5.6		0.00
Kitchen Sink	4	0.44	10.36	12.12
Washing Machine		2.1		0.00
Dishwasher	0.99	3.6		3.56
		Total calculated use (litres/person/day)		33.29
Normalisation Factor				0.91
	Total Water Consumption (CSH) (litres/person/day)			30.29
External Water Use				5.00
	Total Water Consumption (Part G) (litres/person/day)			35.29

Rainwater Harvesting	15.70	litres/person/day	0.65	litres/hour/person/day
Mains Water	19.59	litres/person/day	0.82	litres/hour/person/day
Total	35.29	litres/person/day	1.47	litres/hour/person/day

	Hours	Mains Water Usage	Rainwater Usage	Total Water Usage
Staff	68	55.51	44.49	100.00
Totals	68	**55.51**	**44.49**	100.00

Appendix H

Example Fixtures 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	130 litres	Ideal Standard 
Shower	6 litres/minute	Triton 

Kitchen Sink	4 litres/minute	Tap with flow regulator - Affinity by Moores  Flow Regulator: 

Appendix I

Rainwater Harvesting Calculations

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

AAR	833.69	Average Annual Rainfall
e	0.8	Yield Coefficient
h	0.9	Hydraulic Filter Efficiency
P_d	27.99	Daily Requirement per student
	0.65	Daily Requirement per Member of Staff per hour

Unit	Type	Student Population	Staff Hours	Minimum Roof Area	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank Size (litres)
Broadview	House	6	68	130	7,491	7,433	8,400
	Totals	6	68	130	7,491.20	7,433.24	

Appendix J

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.

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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



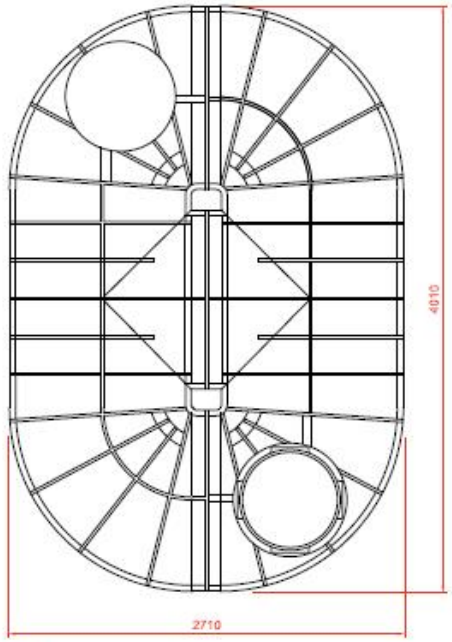


Appendix K

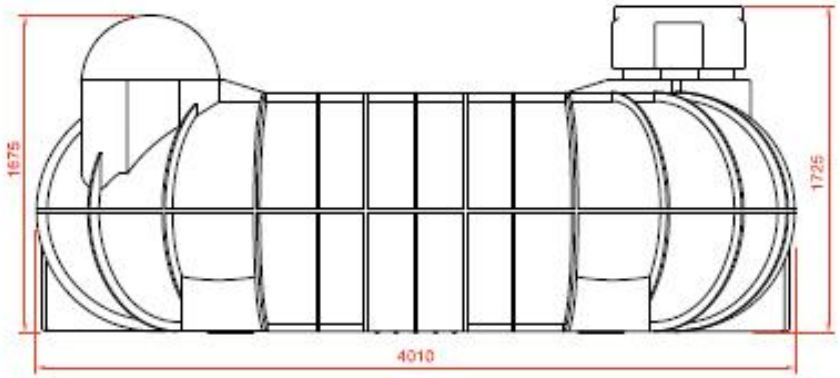
Rainwater Harvesting Tank Dimensions

SDS 8,400 Litre Rainwater Harvesting Tank

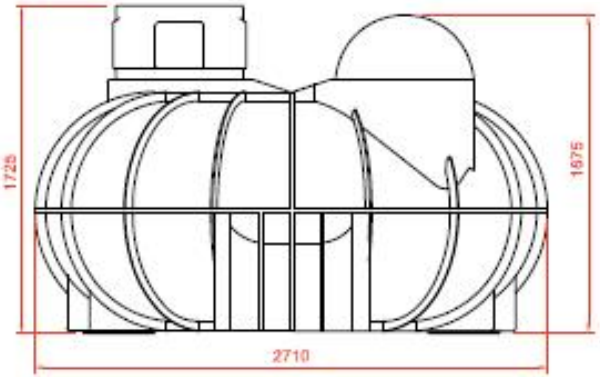




PLAN



SIDE ELEVATION



END ELEVATION

Client	SDS	Details
Project Name	8,400 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 L

Rainwater Harvesting Management and Maintenance Plan

Broadview
Guildford Road, Broadbridge Heath

Rainwater Harvesting Management and Maintenance Plan

For

Silverlake Care

motion

Document Control Sheet

Broadview

Guildford Road, Broadbridge Heath

Silverlake Care

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
12th February 2025	FINAL	Laura Jagiela	Neil Jaques

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2.0 Treatment 2
3.0 Water Quality Control 4
4.0 Continuity of Supply 5
5.0 Maintenance Categories 6
6.0 The Rainwater Harvesting System 7
7.0 General Maintenance Principles 8
8.0 Inspection and Maintenance Frequency of Components 9

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 potential contaminants are listed below:

- pH
- TOC
- Colour
- Turbidity
- Suspended solids
- Conductivity
- Cl, No3, SO4
- Na, Ca, Mg, Al
- Ni, Cr, Cu, Pb
- Total & Dissolved Fe
- Mn
- Ammonium/Ammonia
- TVC, E.Coli, Coliforms, Pseudomonas aeruginosa, Enterococci, Clostridium Perfringens

2.3 The treatment, of the potential contaminants listed above, 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.

2.4 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.

2.5 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.

2.6 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.

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

2.8 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.

2.9 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.

2.10 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