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TECHNICAL NOTE

STORMWATER HARVESTING SYSTEM

GLEBE FARM, STEYNING

AQ-VIS-RE-25-735

R1

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1 INTRODUCTION

Aquality Trading & Consulting Limited were instructed by Vistry Group to produce a technical note providing information on the stormwater harvesting system in support of a Reserved Matter planning application for the proposed development at Glebe Farm, Steyning, West Sussex.

The site has outline approval under application reference DC/21/2233. This document is to support the discharge of condition 19 (water efficiency measures, pre-commencement) of the outline approval and provide additional information in relation to condition 21 (water neutrality, pre-occupation) the application to discharge which will be prepared in due course.

The proposed development layout can be found in Figure 1 below.

Figure 1. Proposed layout

Water Neutrality Statement ('WNS') was submitted at outline planning stage (Technical Note 1: Water Neutrality Statement prepared by Motion, dated 20 August 2024) and is provided in Appendix A.

There have been material changes introduced to the dwellings mix since the time WNS was prepared, causing changes to expected occupancy, total water demand of the development and the volume of non-potable water that need to be introduced for the development to remain water neutral. Additionally, a different type of water reuse system was chosen compared to the one described in the WNS.

This technical note addresses the following:

- Re-calculation of expected occupancy and total water demand of the development.
- Specification of fittings and appliances intended for use in the development.
- Calculation of storrmwater yield availability.
- Description of stormwater harvesting system, including a high-level maintenance plan.

2 UPDATED WATER NEUTRALITY CALCULATIONS

2.1 Updated occupancy

WNS calculates expected occupancy as 576.39. However, according to the latest available accommodation schedule, the mix of dwellings in the development has changed with an increase in share of dwellings with a higher number of bedrooms. As the result, total occupancy is now expected to reach 617.03 (+40.64). Please see Table 1 for calculations of occupancy based on the most recent accommodation schedule and occupancy suggested by the Horsham District Council[1].

Table 1. Updated estimated occupancy

Type	Occupancy per dwelling	Estimates, WNS		Current estimates, number of dwellings			Current estimates, occupancy		
		Number of dwellings	Occupancy	Affordable	Sale	Total	Affordable	Sale	Total
1 bed	1.32	42	55.44	17	0	17	22.44	0	22.44
2 bed	1.88	83	156.04	72	14	86	135.36	26.32	161.68
3 bed	2.47	91	224.77	16	72	88	39.52	177.84	217.36
4 bed	2.86	49	140.14	0	57	57	0	163.02	163.02
5 bed	3.09	0	0	0	17	17	0	52.53	52.53
TOTAL		**265**	**576.39**	**105**	**160**	**265**	**197.32**	**419.71**	**617.03**

2.2 Updated average water consumption per person per day

Compared to the hypothetical specification used in WNS, our Client selected fittings and appliances that meet high efficiency criteria and are available from their supply chain. As the result, the average estimated water consumption expressed in litres per person per day ('lpppd') increased from 79.73 lpppd as per WNS to 82.34 lpppd (+2.61 lpppd). Please see Table 2 for calculations performed with the use of the calculator as per Approved Documents, Building Regulations Part G.

Table 2. Updated water consumption per person per day

Installation type	Unit of measure	Capacity/ flow rate, WNS	Capacity/ flow rate, updated	Use factor	Fixed use (lpppd)	Specification as per WNS			Updated specification		
						Potable water consumption	Non-potable water consumption	Total water consumption	Potable water consumption	Non-potable water consumption	Total water consumption
WC (single flush)	Flush volume (l)	0	0	4.42	0.00	0	0	0	0	0	0
WC (dual flush)	Full flush volume (l)	4	4	1.46	0.00	0	5.84	5.84	0	5.84	5.84
	Part flush volume (l)	2	2.6	2.96	0.00	0	5.92	5.92	0	7.70	7.70
WCs (multipe fittings)	Avg. effective flush volu	0	0	4.42	0.00	0	0	0	0	0	0
Taps (excluding kitchen/utility room	Flow rate (l/min)	2	3.8	1.58	1.58	4.74	0	4.74	7.58	0	7.58
Bath (where shower also present)	Capacity to overflow (l)	120	139	0.11	0.00	13.20	0	13.20	15.29	0	15.29
Shower (where bath also present)	Flow rate (l/min)	6	5	4.37	0.00	26.22	0	26.22	21.85	0	21.85
Bath only	Capacity to overflow (l)	0	0	0.50	0.00	0	0	0	0	0	0
Shower only	Flow rate (l/min)	0	0	5.60	0.00	0	0	0	0	0	0
Kitchen/Utility room sink taps	Flow rate (l/min)	3	5.1	0.44	10.36	11.68	0	11.68	12.60	0	12.60
Washing machine	Litres/kg dry load	5.56	5.56	2.10	0.00	0	11.68	11.68	0	11.68	11.68
Dishwasher	Litres/place setting	0.79	0.68	3.60	0.00	2.84	0	2.84	2.45	0	2.45
Waste disposal unit	Litres/use	0	0	3.08	0.00	0	0	0	0	0	0
Water softner	Litres/pers./day	0	0	1.00	0.00	0	0	0	0	0	0
					Total calculated use (lpppd) =	**58.68**	**23.44**	**82.12**	**59.78**	**25.21**	**84.99**
			Normalisation factor			0.91	0.91	0.91	0.91	0.91	0.91
					Total water consumption internal (lpppd) =	**53.40**	**21.33**	**74.73**	**54.40**	**22.94**	**77.34**
			External water use (lpppd)			0	5.00	5.00	0	5.00	5.00
					Total water consumption (lpppd)=	**53.40**	**26.33**	**79.73**	**54.40**	**27.94**	**82.34**

[1] Source: https://www.horsham.gov.uk/planning/water-neutrality-in-horsham-district/water-neutrality-and-planning-applications

The list of fittings and appliances intended for use in the development is included in Table 3 below. Selected appliances meet or exceed the performance characteristics used for calculation of water demand in the development.

Table 3. Fittings and appliances

Fitting	Performance / flow rate	Source
WC: Ideal E337401 IS I.Life S CIST BI 4/2.6 close coupled E247801 IS i.Life A Cistern BI4/2.6 close coupled white E896701 CisternDual Flush 4/2.6	4/2.6 litre/flush dual flush WC	Ideal Standard https://www.idealspec.co.uk/catalogue/bluebook/toilets/close-coupled-toilets/i-life-a-close-coupled-toilet-with-rimls-technology_p5140.html
Taps: Ideal D054AA Cerabase BSN H80 CHR Click PUW /BD054AA Cerabase BSN H80 CHR Click PUW BST 5LUK / B3304AA Basin Taps Sandringham Basin Pillars	3.8 litre/minute	Ideal Standard https://www.idealspec.co.uk/catalogue/bluebook/taps/basin-taps/cerabase-single-lever-basin-mixer-with-click-waste_p5527.html
Baths: Ideal E258101 Tempo Cube Bath 170 x 70 white TESI Bath 1700 x 70 White NTH	139 litre	Ideal Standard https://www.idealspec.co.uk/catalogue/bluebook/baths/rectangular/tempo-cube-170cm-x-70-75cm_p2621_a4412.html https://www.idealspec.co.uk/catalogue/bluebook/baths/rectangular/tesi-170cm-x-70cm-bath_p3827_a5677.html
Shower: Kelda Deluxe Shower Panel with Handset	5 litre/min	Kelda Showers https://www.keldashowers.com/deluxe-shower-panel-with-ehandset/

Kitchen tap: Aquanomic TAQTECHSLC M/-AN	5.1 litre/min	Heat and Plumb https://www.heatandplumb.com/media/leisure/datasheets/file-516732.pdf
Washing machine: Hotpoint NSWF 946 W UK	5.56 litre/kg (9 kg load, 50 litre/cycle)	Plumbworld https://www.plumbworld.co.uk/hotpoint-nswf-946-bs-uk-fs-9kg-1400rpm-washing-machine-black-102787-1287390
Dishwasher: Hotpoint H7I HP42 L UK	0.63 litre/place setting (15 place settings, 9.5 litre/cycle)	Currys https://www.currys.co.uk/products/hotpoint-maxi-space-h7i-hp42-l-uk-fullsize-fully-integrated-dishwasher-10252595.html

For the avoidance of doubt, fittings and appliances with equal or better performance characteristics can be used as substitutes.

2.3 Updated total estimated water consumption

Using the updated assumptions as per Tables 1 and 2 above, total water consumption at the new development is estimated to reach 50,806 litre/day, an increase of 4,695 litre/day compared to the estimates provided in WNS. Calculations can be found in Table 4 below.

Table 4. Estimated water consumption

	Previous estimates as per WNS	Updated estimates		
		Sale	Affordable	Total
Occupancy	576.39	419.71	197.32	617.03
Estimated water consumption, litre/person/day	80	82.34	82.34	82.34
Estimated water consumption, litre/day	**46,111.20**	**34,558.92**	**16,247.33**	**50,806.25**

2.4 Measures to achieve water neutrality

Following the issue of Natural England's Position Statement on Water Neutrality within the Sussex North Water Zone (SNWZ) in 2021, all planning applications for development in SNWZ require a Water Neutrality Statement demonstrating how water neutrality will be achieved.

There is an increase in the estimated total water demand of the development due to the increase in estimated occupancy and water consumption per person per day compared to those as per WNS, and thus water neutrality needs to be re-confirmed for the project.

The latest specification of fittings and appliances suggested for the development achieves total estimated water consumption below 85 lpppd, or estimated indoor water consumption of below 80 lpppd, which is highly efficient.

2.4.1 Water reuse

In order for the new development to achieve water neutrality, it is intended that all 160 sale dwellings will be included in scope of stormwater harvesting system (please see Section 4 below for more details). It is intended that WCs, washing machines and outside taps of the sale dwellings will be supplied with non-potable water. The estimated water savings available due to the implementation of water reuse are thus calculated as:

> **Water savings from water reuse** = 419.71 (occupancy of sale dwellings) * 27.94 litres/person/day (the demand for non-potable water) = **11,726.70 litres/day**, or 4,280 m3/year on 365-day year

Section 3 below provides calculations of available stormwater yield to confirm that there is sufficient stormwater available to fully cover the demand for non-potable water.

2.4.2 Offsetting measures

After the application of efficient fittings and water reuse there is a residual demand of 39,079 litres/day. It is intended that the residual demand will be covered with the offset of 40,000 litres/day available at Orchard Farm as described in WNS.

2.4.3 Water neutrality confirmation

Water neutrality is confirmed under the updated assumptions through the use of water efficient fittings, implementation of water reuse and offset as per Table 5 below:

Table 5 Water neutrality confirmation

Demand	litres/day
Estimated water demand of new development (using low flow device	50,806
MINUS Water reuse (Stormwater Harvesting)	11,727
Residual water demand	**39,079**
MINUS offset available at Orchard Farm	40,000
TOTAL -	**921**

With the suggested measures the development will meet the requirement of water neutrality with the headroom of 921 litres/day, which represents ~2% of the total water consumption and ~8% of the estimated volume of water savings created by water reuse.

3 STORMWATER YIELD

For the purposes of this report stormwater is defined as precipitation runoff from rain or snowmelt events that flows over land and/or impervious surfaces (e.g. streets, parking lots, and rooftops). Compared to rainwater (i.e. precipitation runoff from roofs), stormwater has additional sources of contamination, including hydrocarbons, PFAS, nutrients, heavy metals, microbial content, suspended solids and other types caused by vehicles, birds, animals, soil, air, surfaces and human waste, and thus requires additional treatment.

The stormwater yield is dependent on the collection surface area, e.g. roofs, driveways, other hardstanding areas that are connected to the surface water drainage system. The drainage strategy for the development (Technical Note BR31285-JNP-XX-XX-RP-C-1003-P03 dated 23/05/2025 prepared by JNP Group, page 33) estimates the total hardstanding area of the development connected to the drainage system as 4.8651 ha.

The stormwater yield is calculated using the methodology as per BS EN 16941-1:2024, using the following assumptions:

1) Collection area: 48,651 m2
2) Rainfall: 752.61mm/year (closest weather control station in Shoreham, 4 miles away from Steyning[2])
3) Surface yield coefficient: 0.7 (conservative assumption as most hardstanding areas will have higher surface yield coefficients of at least 0.8 for the pitched roofs and 0.8 for sealed areas such as roads and most parking spaces)
4) Filter coefficient: 0.9 (default value as per BS)

Total stormwater yield is thus estimated as:

Stormwater yield = 48,651 * 752.61 * 0.7 * 0.9 = **23,067,594 l/ year**, or 23,068 m3/ year.

The demand for non-potable water of the development (4,280 m3/year) represents ~20% of the available stormwater yield (23,068 m3/year), and thus the demand for non-potable water can be met in full.

[2] Source: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcpc1q7m5

4 STORMWATER HARVESTING SYSTEM

4.1 Alternative approach

WNS provided information on the individual rainwater harvesting systems that were suggested to be installed at the individual dwellings, providing water savings that allowed the development to achieve water neutrality.

Since then, our Client re-examined the approach and decided to proceed with an alternative approach, following the principles of sustainable drainage and combining attenuation infrastructure with that of water reuse system. It is now suggested that a communal stormwater harvesting system will be installed to provide non-potable water to 160 of the sale dwellings. The system will use drainage network of below ground surface water sewers to collect and convey stormwater to five interconnected attenuation basins along the northern border of the plot. Attenuation basins will serve dual purpose: as attenuation features as well as storage of water for water reuse system. It is suggested that the stormwater harvesting system is placed in the area between attenuation basins 2 and 3 (please see Appendix B for a section of drainage layout), next to the outfall. The stormwater harvesting system will draw the water from the basins, treat it and supply to the sale dwellings.

The suggested approach has the following advantages compared to the use of individual rainwater harvesting systems as suggested in the WNS:

1) The use of integrated attenuation and water reuse system follows the principles of sustainable drainage.
2) Under the integrated approach attenuation capacity (including storage) can be used to support water reuse system and benefits from a larger volume of available surface water compared to the individual rainwater harvesting system, thus ensuring higher resilience.
3) Communal systems allow for higher degree of control as do not depend on the behaviour of residents or access to their dwellings.
4) Professional maintenance, including remote monitoring of performance and timely resolution of issues, is available for communal systems.
5) Ability to retain water in attenuation basins positively contributes to biodiversity and placemaking.

4.2 Description of stormwater harvesting system

The schematic of the proposed stormwater harvesting system can be found in Appendix C.

As described before, the stormwater harvesting system will use the surface water drainage system to collect the rainwater and convey it to the attenuation basins. The water reuse system will be located close to the outfall from the site right after the flow restrictor (Hydrobrake). The surface water will be pre-treated via a compact low maintenance filter that will capture and retain sediments, oil, trash and floatables before pre-treated water enters a 50m3 underground storage tank. The tank will provide buffer

volume of water that will not be exposed to the environment, thus ensuring good water quality for the next step.

A valve chamber downstream of the underground tank will be installed to block the outflow from site when no or non-severe rainfall events are predicted. It will be using an “active” control that is based on weather forecast data.

The weather forecast data will be used to monitor the upcoming rain events and prepare the attenuation basins such that there is sufficient attenuation capacity available to accommodate the anticipated volume of water during the upcoming event. The system is designed to ensure that attenuation capacity performs its primary function during the rainfall events, at the same time it ensures that collected water is retained as much as possible when no rain is expected. The system operates by controlling the valve to outflow, thus changing the functionality of attenuation basins between attenuation or stormwater harvesting storage.

The system can operate in a fully automated mode and can be monitored remotely. As a safety measure, it can also be overridden in the manual mode and an operator can access the system through the web-based dashboard.

The system offers a number of further safety features, including protections enabling its operation during various weather conditions and in case of power failure, ability to send warning messages to operators via SMS, and defaulting to storm attenuation mode (valve to outflow open) in case of failure.

This enables to store water in the basins to the required 35-day volume and more. It is estimated that retention basins will have the maximum storage volume of 3,820 m^3 and thus, even when 50% full, their storage volume will be equivalent to 161 day storage necessary to support water reuse system, vastly exceeding the requirement of 35 day storage.

The water from the underground tank will be lifted into the treatment house for further treatment.

The treatment of the water will include colour and odour removal as well as a disinfection stage. The quality of treated water will be monitored to ensure compliance with the requirements as per the BS EN 16941-1:2024.

The treated water will be fed into a break tank from where it will be pumped to the sale dwellings via a dedicated non-potable water distribution pipework. The break tank will include an emergency mains water back up via AA type air-gap to provide continuous supply in times of lacking rainwater.

4.3 System maintenance

The suggested maintenance schedule is aligned with the recommendations as per BS EN 16941-1:2024, and can be further refined at the next stage when detailed designs are prepared and suppliers of specific components identified, taking into account specific environmental usage conditions and manufacturer’s guidelines.

At this stage, the inspection and maintenance works and frequencies are envisaged as per Table 6 below:

Table 6. Inspection and maintenance works

System element	Inspection and maintenance (if required)	Frequency
Attenuation basins and adjacent areas	Inspection for litter and debris, removal if necessary Inspection of mechanical devices	Monthly, or as required
	Inspection of bankside vegetation and grass, removal of excess vegetation / cutting the grass	Monthly (during growing season)
	Inspection of banksides, structures, pipework etc for evidence of blockage or physical damage	Monthly as start, then as required
	Inspection of water body for signs of poor water quality	Monthly, or as required
	Inspection of mechanical devices	Half yearly
	Inspection of silt accumulation rates	Monthly, or as required
	Removal of sediment	Every 1-5 years, or as required
	Removal of 25% of bank vegetation from water's edge to a minimum of 1m above water level, scrub clearance	Annually
	Repair erosion or other damage, replant where necessary, aerate pond when signs of eutrophication are detected, repair / rehabilitate inlets, outlets and overflows	As required
Preliminary treatment component	Check efficiency and overall good condition, eliminate deposits if required	6 months
Underground tank	Check overall good condition, clean if required	12 months
Operational controls	Observation of operation cycle, repairs according to the manufacturer's instruction	6 months
Pumps	Check proper operation and absence of leaks, repair according to the manufacturer's instruction	6 months

Pressurised tank	Check proper operation and tightness, repair according to the manufacturer's instruction	12 months
Mains water top up	Check proper operation with the tap wide open, repair according to the manufacturer's instruction	12 months
Water level sensors	Check adequacy between the actual filling level and the level displayed, adjust or replace if required	12 months
Water meters	Check proper operation, replace if required	12 months
Treatment plant	Check proper operation and absence of leaks, replace consumables and conduct repairs according to the manufacturer's instruction	6 months

The system will require a LAN and internet connection which will allow for remote monitoring, thus supporting early detection of issues and their early resolution.

It is our understanding that the water reuse system may be considered a private water supply under the Private Water Supply Regulations 2016, and under the assumption of volume of water treated exceeding 10m3/day may be classified as a large supply. If this is determined to be case, it is expected that the supplier of the water reuse system will work with the Local Authority to conduct risk assessment and agree on the measures and their frequency that would support monitoring activities by the Local Authority so that the Local Authority could fulfil their statutory duties.

5 APPENDICIES

Disclaimer

This report has been prepared by Aquality Trading and Consulting Limited ('Aquality') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Aquality was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e., parties other than the Client). Aquality accepts no duty or responsibility (including in negligence) to any party. All project information shown within the report is supplied by the client therefore Aquality does not accept liability for any results as a consequence of the information provided.

5.1 AQUALITY – Water Reuse Specialists

Aquality is one of the longest established and leading suppliers of non-potable water system especially rainwater harvesting and greywater recycling systems in the UK with offices in France and Germany.

With decades of in-house experience in this market, we pride ourselves in offering a complete package from design, supply, install to operation to Designers, Consultants, Mechanical Contractors, Building Contractors, Civil Engineering Contractors, and end users in both the Commercial and Residential market.

Aquality launched a new concept for stormwater management allowing the use of attenuation tanks for rainwater harvesting without increased storage volume potentially making rainwater harvesting system 50% cheaper.

5.2 Experience

We provide water reuse as well as stormwater management solutions including blue roofs. The solutions cover all project types such as the Bloomberg HQ, Westfield Shopping Centre, London Kings Cross or The Shard as well as district type developments (Southbank) and Housing developments such as Clay Farm in Cambridge.

Clay Farm, Cambridge

A 208-dwelling development on a greenfield site created and installed with a Centralised rain-/stormwater harvesting system. Water is collected from roofs and hardstanding and treated via a reed bed. Treated water is stored in a 250m^3 underground tank and distributed via central plant room for WC use.

Southbank Development, London

The Development consists of 6 Residential towers & 2 commercial office towers developed with 23,000m^2 area connected to attenuation tanks.

Water is collected via rainwater harvesting and greywater recycling. Excess greywater is being transferred to the commercial towers for use.

5.3 Monitoring & maintenance

Bespoke monitoring systems can be implemented on all Aquality provided equipment providing real-time insights into the health and status of all systems. A team of specialist operators and engineers overlook monitoring and maintenance, carry out repairs with our stock of spares and also preventative maintenance where required.

5.4 Accreditation

Aquality are members of the UK WRA (UK Water Reuse Association), UKGBC (UK Green Building Council), FBR (German Rainwater Harvesting Association), ARCSA (American Rainwater Catchment Systems Association).

The Managing Director of Aquality, Lutz Johnen, is well respected in the industry and the current chairman of the UK Rainwater Management Association. He is a member of the British Standards Committee (dealt with BS EN 16941-1 & 2 for water reuse) and currently represents the UK on the European Standard relating to water reuse.

5.5 Carbon savings

Per m^3 of water that has been saved and reused, there is an element of carbon savings to be achieved when not using mains water supply. Rainwater Harvesting provides a saving of 86% over mains water supply and Greywater recycling provides a saving of 77% over mains water supply.

5.6 Appendix A – Water Neutrality Statement

Technical Note 1: Water Neutrality Statement

Site: Glebe Farm, Steyning, Horsham (BN44 3FL)
Prepared by: Ella Harrop
Approved by: Neil Jaques
Date: 20th August 2024

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1.0 Introduction

1.1 This Water Neutrality Statement (WNS) has been prepared on behalf of Richborough Estates Limited ("Richborough") in support of the outline planning application for the proposed development of Land north of Glebe Farm and King's Barn Lane, Steyning, BN44 3YR (the "Site").

1.2 The Planning Application is registered with Horsham District Council ("HDC") with a reference of DC/21/2233 with the following description of development: *"Outline application for up to 265 dwellings, demolition of No. 37 Kings Barn Lane to provide new pedestrian/cycle/emergency link, provision of vehicular access from the A283 Steyning by-pass, provision of public open space, community orchard, sustainable drainage and other ancillary and enabling works. All matters reserved except for vehicular access from A283."*

1.3 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 planning applications to demonstrate that a development within the SNWSZ can be water neutral. NE's Position Statement can be found in full within Appendix A.

1.4 The Site is situated within the SNWSZ and this WNS demonstrates how the proposed development will achieve water neutrality. A plan showing the supply area can be found in Appendix B.

1.5 This WNS sets out the following:

- Baseline calculations for the existing development;
- Additional demand as a result of the proposed development;
- What water reduction measures have been employed, such as water efficient fixtures and fittings and rainwater harvesting; and
- Measures to offset the increased water demand of the development, should it be necessary.

2.0 Background

2.1 The proposed development is located at land north of Glebe Farm, King's Barn Lane, Steyning, West Sussex (BN44 3FL).

2.2 The site currently comprises of paddocks, pasture land and part livery.

2.3 Richborough have assumed an indicative mix of house types in accordance with Table 71 of the 'Northern West Sussex Strategic Housing Assessment (November 2019)' based on an Affordable Housing provision of 40% and a tenure split of 70% Affordable Rented and 30% Low-Cost Home Ownership, as is shown in the table on the next page. A copy of the proposed illustrative masterplan can be seen in Appendix C.

	Affordable Rented	Low Cost Home Ownership	Market Housing	Combined
1-bed	35% (26no.)	25% (8no.)	5% (8no.)	16% (42no.)
2-bed	30% (22no.)	40% (13no.)	30% (48no.)	31% (83no.)
3-bed	25% (19no.)	25% (8no.)	40% (64no.)	34% (91no.)
4-bed	10% (7no.)	10% (3no.)	25% (39no.)	18% (49no.)

Table 2.1 - Indicative Housing Mix Table

3.0 Baseline Calculations

3.1 The baseline calculation has been assumed as zero litres per day for the purpose of this WNS.

3.2 The Site's existing water use, associated with its current use as paddocks, pasture land and part livery, will cease upon the Site's development. This existing use has been ignored for the purpose of this exercise, which will, therefore, provide a greater benefit than is currently indicated.

4.0 Additional Demand

4.1 As previously defined, the proposed redevelopment of the site will provide 42 one-bedroom units, 83 two-bedroom units, 91 three-bedroom units and 49 four-bedroom units.

4.2 Part G of the current Buildings Regulations recommends that all developments achieve a 'water efficient' consumption of 125 litres per person per day. This water consumption figure can be used with the population of the proposed development to calculate what the future demand is likely to be.

4.3 The occupancy levels for the development have been drawn from local census data (as recommended by HDC in their water neutrality methodology guidance) and this is summarised in Table 4.1 below.

1-bedroom	2-bedroom	3-bedroom	4-bedroom	5-bedroom
1.32	1.88	2.47	2.86	3.09

Table 4.1 – Average district occupancy levels per dwelling size

4.4 Using the above census data and the housing mix defined above, the population of the proposed development is estimated to be 576.39 persons.

4.5 Using the Building Regulations water consumption figure of 125 litres per person per day and population size of 576.39, it is estimated that the total water usage per day for the proposed development would be 72,048.75 litres per day.

5.0 Water Reduction Measures

On-site Water Reduction Measures – Fixtures and Fittings

5.1 To further minimise the demand on the mains water, it is proposed that the new dwellings will achieve a water efficiency of less than 85 litres per person per day of water, which will be in accordance with the JBA Consulting's 'Sussex North Water Neutrality Study: Part C – Mitigation Strategy and the optional water efficiency target set out in the Building Regulations Part G. This will be achieved through the use of water efficient fixtures and fittings.

5.2 A water calculation in accordance with Buildings Regulations Part G has been carried out and confirms that all the proposed dwellings will achieve a water consumption of 80 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 D and is summarised in Table 5.1, 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)	4.74	4.74	
Shower	26.22	26.22	
Bath	13.20	13.20	
Kitchen Taps	11.68	11.68	
Washing Machine	11.68		11.68
Dishwasher	2.84	2.84	
Total	82.12	58.68	23.44
Normalisation Factor	0.91	0.91	0.91
Total	74.73	53.40	21.33
External Water Use	5.00		5
Total	79.73	53.40	26.33

Table 5.1 – Water Usage

5.3 Further details of the fixtures and fittings to deliver the above water efficiency detailed Table 5.1 will be agreed at the Reserved Matters Stage.

5.4 This WNS has taken a precautionary approach and rounded up the total proposed water usage to 80 litres per person per day, which will be taken forward in the calculation.

5.5 Using the rounded Part G water consumption figure of 80 litres per person per day and the census-based development population of 576.39 it is estimated that the mains water demand per day for the proposed development can be reduced to 46,111.20 litres per day, based entirely on a fixtures and fittings approach.

On-site Water Reduction Measures - Rainwater Harvesting Systems

5.6 In addition to all dwellings achieving a water usage equal to 80 litres per person per day, rainwater harvesting systems will be installed for the benefit of 107 dwellings (or 232.73 persons), equating to 40.38% of the proposed development's population, to further reduce the proposed mains water usage on Site.

5.7 The rainwater harvesting system will enable the further reduction of mains water by 26.33 litres per person per day to reduce the water demand to 53.40 litres per person per day, as summarised in Table 5.1, above.

5.8 The size of the rainwater harvesting tanks for the proposed development 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, as required by HDC.

5.9 The roof materials of the proposed dwellings are unknown at this stage. Therefore, a precautionary approach has been taken and a yield coefficient of 0.8 has been used in the calculations.

5.10 Detailed plans are not available at this stage of the proposed development, as it is an outline planning application. Therefore, the calculations use the average floor areas for each dwelling size. These areas will be smaller than the roof areas for each dwelling and therefore offers a precautionary approach to the calculations.

5.11 Calculations use the annual rainfall data from the nearest MET Office climate station to the proposed site, which is Shoreham. The calculations are summarised in Table 5.2 below and can be found in full in Appendix E.

Unit	Population	Average Floor Area (m^2)	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank Size (litres)
1-bed	1.32	60.4	3,142	1,218	1,800
2-bed	1.88	76.6	3,985	1,735	2,600
3-bed	2.47	98.7	5,134	2,279	2,600
4-bed	2.86	140.5	7,309	2,639	3,400

Table 5.2 – Rainwater Harvesting Sizing Calculation

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

5.13 The dimensions of the proposed tanks can be found in Appendix G. It is initially proposed that each house, with a rainwater harvesting system, will have an individual tank. However, a communal system might be explored at the detailed design stage.

5.14 A draft Management and Maintenance Plan has been prepared for the rainwater harvesting systems and can be found in Appendix H.

5.15 As per paragraph 5.3, further details of the rainwater harvesting system to deliver the above water efficiency will be agreed at the Reserved Matters Stage.

5.16 The commitment to installing rainwater harvesting systems to 107 dwellings (or 232.73 persons) will yield an additional mains water reduction of 6,127.78 litres per day.

5.17 Therefore, following the on-site water reduction measures, there will be a net increase in mains water demand of 39,983.42 litres per day. At this stage, the proposed development cannot be considered to be water neutral and therefore, to achieve water neutrality, further offsetting measures are required.

5.18 Should it be determined additional on-site water reduction measures are required to achieve 'neutrality' in addition to installing rainwater harvesting systems to the 107 dwellings, then additional dwellings will incorporate rainwater harvesting systems to achieve a net mains water consumption of 40,000 litres per day.

6.0 Offsetting Measures

6.1 To ensure the development can demonstrate water neutrality, in accordance with the NE Position Statement, a residual water demand of 39,983.42 litres per day will need to be offset.

6.2 Richborough proposes to offset the Site's increased water demand through an offsetting scheme at Orchard Farm, Emms Lane.

Offsetting from Orchard Farm, Emms Lane

6.3 The offsetting scheme is located at Orchard Farm, Emms Lane, Brooks Green, Horsham (RH13 0TR). This proposal is for a water reduction resulting from the recent change of use of a substantial part from agricultural to commercial together with a reduction in mains water use from the remainder of the existing poultry farm.

6.4 The water bills from Orchard Farm show the baseline water usage to be 65,300 litres per day.

Orchard Farm, Emms Lane – Buildings 18, 19, R1, R2

6.5 The approved planning application at Orchard Farm (DC/23/1512) for the change of use in buildings 18, 19, R1 and R2, shows an accepted reduction in water use. The Water Neutrality Statement for this scheme can be found in full in Appendix I.

6.6 The application shows that the existing baseline water usage for the buildings totals 14,179 litres per day. The proposed water usage after redevelopment of the site would reduce the water usage to 2,900 litres per day. This would provide a reduction in mains water usage by 11,279 litres per day.

Orchard Farm, Emms Lane – Buildings 14, 15, 16, 17, Packing Shed

6.7 The approved planning application at Orchard Farm (DC/24/0185) for the change of use in buildings 14, 15, 16, 17 and Packing Shed, shows a reduction in water use. The Water Neutrality Statement for this scheme can be found in full in **Appendix J**.

6.8 The application shows that the existing baseline water usage for the buildings totals 17,719.2 litres per day. The proposed water usage after redevelopment of the site would reduce the water usage to 3,615 litres per day. This would provide a reduction in mains water by 14,104.2 litres per day.

Orchard Farm, Emms Lane – Remainder of the existing poultry farm

6.9 The agreed baseline for the remainder of Orchard Farm after netting off the two change of use consents is, therefore, 33,401.8 litres per day.

6.10 Given the significant reduction in the scale of the poultry farm, including the loss of the packing shed and egg washing facilities, the residual use is no greater than 18,875 litres per day.

6.11 This provides a further reduction of 14,616.8 litres per day.

6.12 The table below shows the baseline, residual and reduction in water usage for Orchard Farm.

	Baseline (l/d)	Residual (l/d)	Reduction (l/d)
Change of Use (DC/23/1512)	14,179	2,900	11,279
Change of Use (DC/24/0185)	17,719.2	3,615	14,104.2
Remainder of Orchard Farm	33,401.8	18,785	14,616.8
Combined	**65,300**	**25,300**	**40,000**

Table 6.1 – Residual Water Usage on Orchard Farm, Emms Lane

6.13 The reduction of 40,000 litres per day at Orchard Farm, as Offsetting for the proposed development, will be secured by a Planning Obligation not to use more than 25,300 litres per day across the Combined Orchard Farm Site.

7.0 Summary and Conclusions

7.1 This Technical Note sets out the water usage strategy for the proposed development of the Site, known as Land north of Glebe Farm and King's Barn Lane, Steyning (BN44 3YR).

7.2 The proposal is to incorporate water efficient fixtures and fittings in the proposed dwellings, to minimise the water demand of the proposed development to 80 litres per person per day and to incorporate rainwater harvesting systems to a number of dwellings.

7.3 The proposed development represents a net increase in water demand within the SNWSZ, and this increase in water demand will be offset off-site through an offsetting scheme at Orchard Farm.

7.4 This strategy will minimise the impact of the new development on the SNWSZ. This WNS confirms the proposal will be water neutral once complete and therefore satisfying NE'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.

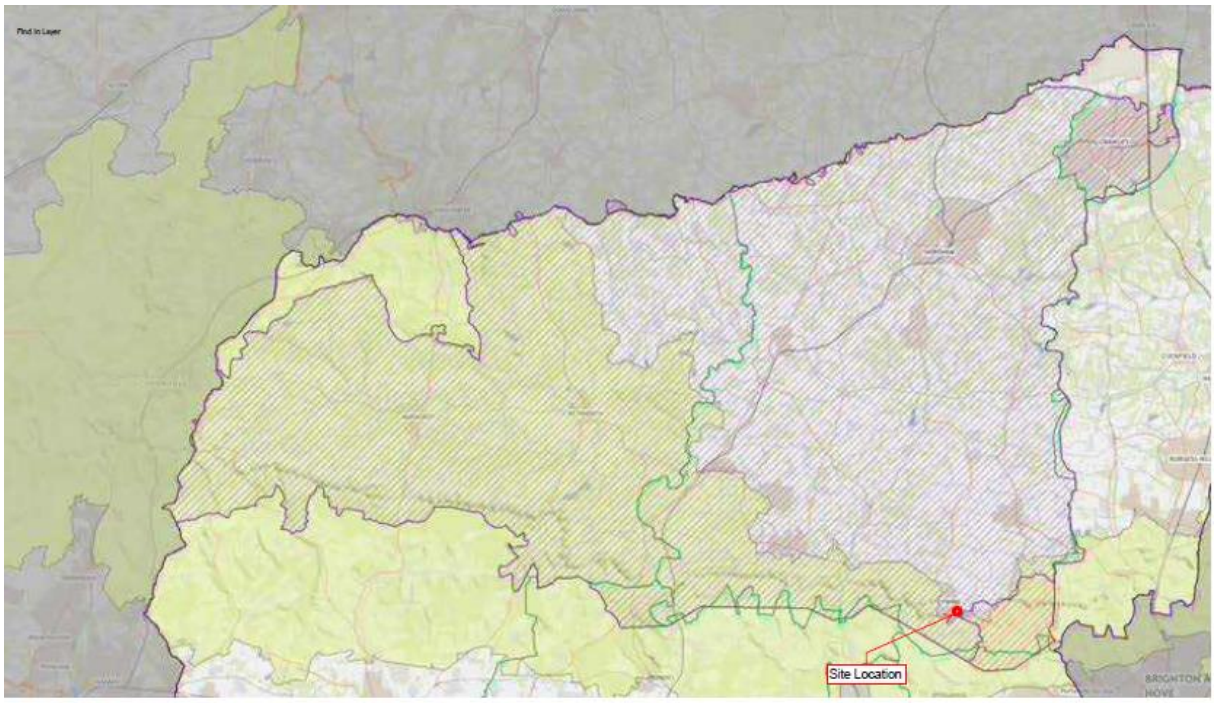
If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

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



Sussex North Water Supply Zone Map

Appendix C

Indicative Site Layout


SITE LOCATION
14.24 HECTARES / 35.2 ACRES
PROPOSED RESIDENTIAL DEVELOPMENT
PUBLIC OPEN SPACE (INCLUDING SuDS) - 9.23 HA / 15.40 ACRES
RETAINED EXISTING LANDSCAPE
ADDITIONAL/ REINSTATED VEGETATION
PRIMARY STREET / AVENUE
KEY FOCAL JUNCTION
SECONDARY STREET
SIDE STREET / SHARED SURFACE
RURAL LANES/ SHARED SPACES
PRIVATE LANES
EXISTING PUBLIC RIGHT OF WAY
DOWNS LINK NATIONAL TRAIL / LONG DISTANCE ROUTE & NATIONAL CYCLE ROUTE 223
KEY PEDESTRIAN MOVEMENT WITHIN SITE
KEY PEDESTRIAN/CYCLE MOVEMENT WITHIN SITE
BOARDWALK STYLE PEDESTRIAN MOVEMENT
SUSTAINABLE URBAN DRAINAGE
LOCALLY EQUIPPED AREA OF PLAY
NATURAL AREA OF PLAY
LISTED BUILDING
KEY PRINCIPLES:
1. PROPOSED NEW ACCESS;
2. EXISTING PUBLIC RIGHT OF WAY UPGRADED;
3. LANTRA: PRINCIPAL STREET;
4. OUTWARD FACING DEVELOPMENT PROVIDING NATURAL SURVEILLANCE OVER OPEN SPACE;
5. PROPOSED PEDESTRIAN/ CYCLE LINK AND EMERGENCY VEHICLE ACCESS VIA KING'S BARN LANE;
6. SECONDARY STREET MOVEMENT;
7. KEY FOCAL VIEWS BENEFITING FROM VIEWS OF ST ANDREWS CHURCH AND THE DOWNS
8. TERTIARY RURAL LANES;
9. SHARED SURFACE STREETS;
10. PRIVATE LANES;
11. PRIVATE VEHICULAR LINK TO ADJOINING LAND TO NORTH;
12. EXISTING HEDGEROWS INCORPORATED INTO GREEN INFRASTRUCTURE;
13. NEW HEDGEROWS;
14. CENTRALLY LOCATED STEYNING COMMON BENEFITING FROM AN EQUIPPED AREA OF PLAY;
15. CENTRAL "RIBBON PARK" CONNECTING NEW GREEN SPACES;
16. NEWLY CREATED COMMUNITY ORCHARD;
17. LANDSCAPED BUFFER TO EXISTING DEVELOPMENT;
18. DEVELOPMENT SETBACK TO ADDRESS LISTED BUILDING;
19. KEY ARRIVAL GATEWAY SPACE;
20. KEY MEETING POINTS PROVIDING OPPORTUNITIES FOR SOCIAL INCLUSION;
21. ECOLOGY CORRIDOR WITH ADDITIONAL NATIVE PLANTING;
22. CREATION OF A WETLAND HABITAT WITH BOARDWALK STYLE PEDESTRIAN MOVEMENT; AND
23. PRIVATE VEHICULAR ACCESS TO RETAINED LAND; AND
24. PROPOSED PEDESTRIAN CROSSING, RAMP AND STEPPED ACCESS AT THE NEW SITE ACCESS ROUNDABOUT.
KING'S BARN LANE
KING'S BARN END
LAND OFF KING'S BARN LANE, STEYNING | PROPOSED ILLUSTRATIVE MASTERPLAN
Pegasus

Appendix D

Part G Calculations

Part G - 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	1.58	1.58	4.74
Bath (where shower present)	120	0.11		13.20
Shower (where bath present)	6	4.37		26.22
Bath Only		0.5		0.00
Shower Only		5.6		0.00
Kitchen Sink	3	0.44	10.36	11.68
Washing Machine	5.56	2.1		11.68
Dishwasher	0.79	3.6		2.84
	Total calculated use (litres/person/day)			82.12
Normalisation Factor				0.91
Total Water Consumption (CSH) (litres/person/day)				74.73
External Water Use				5.00
Total Water Consumption (Part G) (litres/person/day)				79.73

Total	80	litres/person/day

	Number of units	Census	Population	Mains Water Usage	
Proposed 1-bed	42	1.32	55.44	4,435.20	
Proposed 2-bed	83	1.88	156.04	12,483.20	
Proposed 3-bed	91	2.47	224.77	17,981.60	
Proposed 4-bed	49	2.86	140.14	11,211.20	
Totals	**265.00**		**576.39**	**46,111.20**	litres/day

Appendix E

Rainwater Harvesting Calculations

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

AAR	752.61	Average Annual Rainfall
e	0.8	Yield Coefficient
h	0.9	Hydraulic Filter Efficiency
P_d	26.33	Daily Requirement per Person

Unit	Type	No. Beds	Population	Average Total Floor Area (m2)	9.6% Annual Rainwater Yield (litres)	9.6% Annual Water Demand (litres)	Tank Size (litres)
1-bed	House	1	1.32	60.4	3,142.03	1,217.84	1,800
2-bed	House	2	1.88	76.6	3,984.76	1,734.49	2,600
3-bed	House	3	2.47	98.7	5,134.41	2,278.83	2,600
4-bed	House	4	2.86	140.5	7,308.87	2,638.65	3,400

Appendix F

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
Rodent Guard
Pollinsan Filter
Colmed Inlet
S Series Pump & Float Switch
Pump Tubet
Floating Intake
Pump Lifting Chain
Inside the Household
Top Up Controller
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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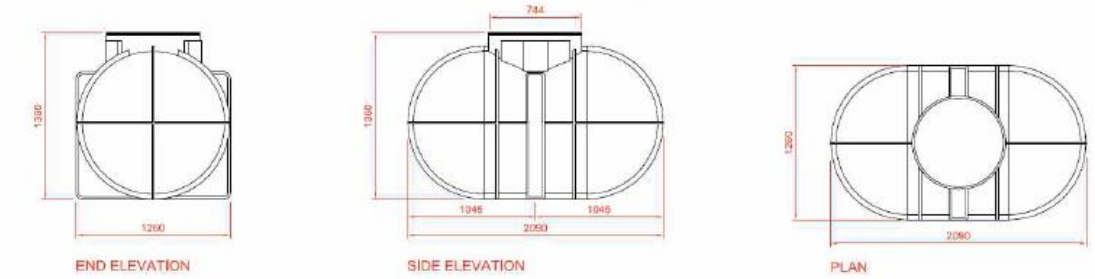
Appendix G

Rainwater Harvesting Tank Dimensions

SDS 1,800 Litre Rainwater Harvesting Tank



Client	SDS	Details
Project Name	1,800 Litre Tank	
Type	Standard Detail	
Date	-	
Drawing no.	-	
Revision	A	

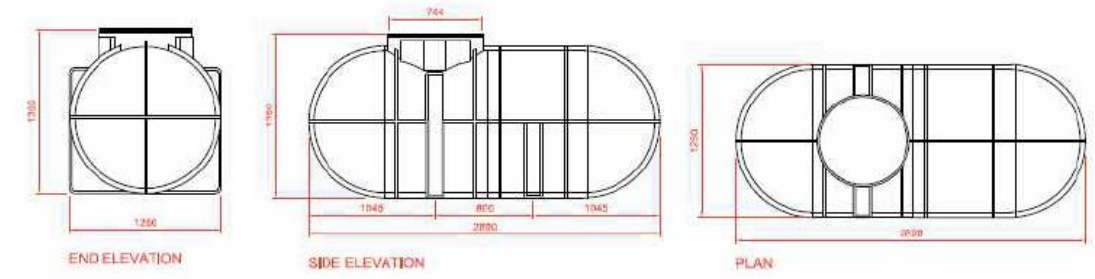
Notes:

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

SDS 2,600 Litre Rainwater Harvesting Tank



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

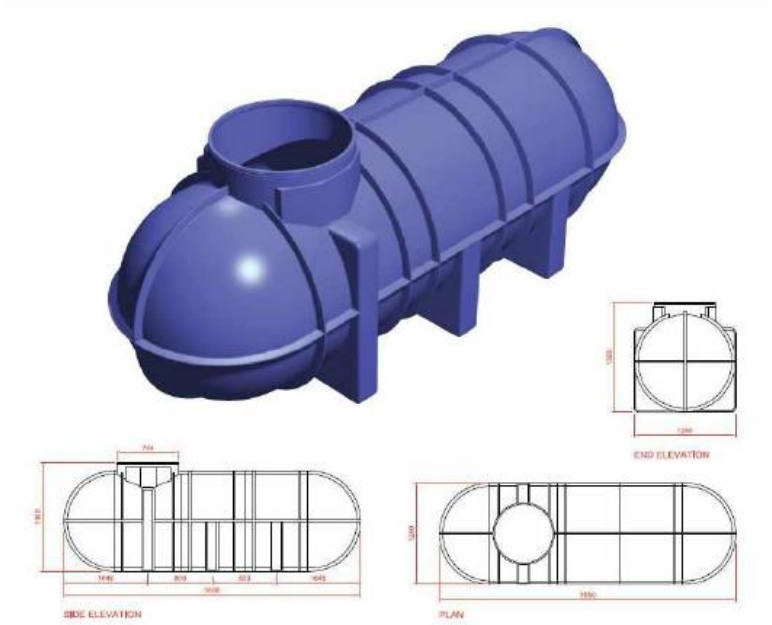
Notes:

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

SDS 3,400 Litre Rainwater Harvesting Tank



Client	SDS	Details
Project Name	3,400 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 H

Rainwater Harvesting Management and Maintenance Plan

aquality
intelligent water management

motion

Glebe Farm
Steyning, Horsham

Rainwater Harvesting Management and Maintenance Plan

For

Richborough Estates Limited

Document Control Sheet

Glebe Farm

Steyning, Horsham

Richborough Estates Limited

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
20th August 2024	DRAFT	Laura Jagiela	Neil Jaques

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Contents

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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

Appendix I

DC/23/1512 Water Neutrality Statement

Water Neutrality Statement

Background

The site falls within the Sussex North Water Supply Zone which covers the whole of Horsham District and parts of the administrative areas of Chichester and Crawley. Natural England have written to these authorities and provided a Position Statement on developments which may place increased pressure on water abstraction this zone. The Position Statement explains in greater detail (including with reference to recent case law) that abstraction from the Sussex North Water Supply Zone may be having an impact on protected sites, namely the Arun Valley Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar. In order not to exacerbate the impact, developments within this zone must not take palace unless they can be considered water neutral and do not result in an increase in mains water usage.

Water neutrality can be achieved through minimising water use through a water budget, strict water targets, greywater recycling, rainwater harvesting, water-efficient fixtures and water offsetting.

The application proposals

The application proposes the conversion of agricultural buildings into commercial buildings within use classes E and B8 used for either light industry or storage/distribution.

It is recognised that the intensity of the use of buildings can result in different water demands depending on the use and occupancy and therefore regard has to be had to this.

Baseline water usage position

The water bills (enclosed) for the farm show that water usage averaged 65-67m^3 per day (65,000-67,000 litres per day). This is considerable reflecting the volumes of poultry at the farm and staff.

Proposed development water usage

The application buildings have a GIA of 3,425m^2 which would be in either B8 or Class E(g)iii use. It is expected that each unit would have a male and female toilet and kitchen area for staff. The OffPAT employment density figures identify that a B8 use could generate 1 employee per 80m^2 (total 42.8 for the development) and that a Class E(g)iii use could generate 1 employee per 47m^2 (total 72.9 for the development). Therefore, a light industrial use would generate a higher level of occupancy than a storage use.

Assuming a generous water usage per person of 50 litres per day for a person employed in a warehouse or light industrial unit and applying the employment densities this would provide a daily usage of 2,140 litres per day for a B8 storage and distribution use or 3,645 litres per day for a Class E(g)iii light industrial use.

Therefore, the water usage of the new units would be a small fraction of those of the poultry use (5.6% assuming the higher water usage associated with a light industrial use).

Conclusion

Having regard to the above, the proposed commercial use of the former poultry buildings would be water neutral and would not result in any greater mains water usage than the existing agricultural use. In fact the proposals would positively reduce the water usage on the site from historic levels. This would be the case even if all of the buildings at the farm were converted to commercial uses. This water neutrality strategy also accounts for the worst case scenario in terms of water usage to ensure there is no harm to the aforementioned habitats.

Appendix J

DC/24/0185 Water Neutrality Statement

Water Neutrality Statement

Orchard Farm, Emms Lane, Brooks Green, Horsham RH13 0TR

Buildings 14-17 and former packing building

Background

The site falls within the Sussex North Water Supply Zone which covers the whole of Horsham District and parts of the administrative areas of Chichester and Crawley. Natural England have written to these authorities and provided a Position Statement on developments which may place increased pressure on water abstraction this zone. The Position Statement explains in greater detail (including with reference to recent case law) that abstraction from the Sussex North Water Supply Zone may be having an impact on protected sites, namely the Arun Valley Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar. In order not to exacerbate the impact, developments within this zone must not take palace unless they can be considered water neutral and do not result in an increase in mains water usage.

Water neutrality can be achieved through minimising water use through a water budget, strict water targets, greywater recycling, rainwater harvesting, water-efficient fixtures and water offsetting.

The application proposals

The application proposes the conversion of agricultural buildings into commercial buildings within use classes E and B8 used for either light industry or storage/distribution.

It is recognised that the intensity of the use of buildings can result in different water demands depending on the use and occupancy and therefore regard has to be had to this.

Baseline water usage position

The water bills (enclosed) for the farm show that water usage averaged 65-67m^3 per day (65,000-67,000 litres per day). This is considerable reflecting the volumes of poultry at the farm and staff. Within the previous application (DC/23/1512) Officers and Natural England based their assessment on the lower end of the average water usage (65,300 litres per day). This was split proportionately over the 11 buildings on site equating to an average water usage of 4.14 l/p/d per m^2. Applying the proportional split to the three application buildings, which measure 1,342m^2, 250m^2 and 2,688m^2 (total 4,280m^2), this arrives an at existing baseline water use of 17,719.2 l/p/d (application site).

Previously approved water usage for DC/23/1512

The approved development identified a water usage of 2,900 l/p/d in the buildings for that application (a reduction from the 11,279 l/p/d associated with the poultry use for those buildings). As that application related to different buildings on the farm with the water usage proportionally split across the buildings, the water usage has no bearing

on the current application and the water usage does not need to be considered cumulatively.

Poultry buildings brought back into use

Similarly, whilst some of the former poultry buildings have now been brought back into use (4,087m²), the water usage of these would be consistent with the baseline water usage (16,920.2 l/p/d) and have no bearing on the current proposals.

Proposed development water usage

The application buildings have a GIA of 4,280m² which would be in either B8 or Class E(g)iii use. It is expected that each unit would have a male and female toilet and kitchen area for staff. The OffPAT employment density figures identify that a B8 use could generate 1 employee per 80m² (total 53.5 for the whole development) and that a Class E(g)iii use could generate 1 employee per 47m² (total 91.1 for the whole development). Therefore, a light industrial use would generate a higher level of occupancy than a storage use. Within the previous application (DC/23/1512) Officers and Natural England considered it appropriate to apply an average across both use classes which in this instance would amount to 72.3 employees.

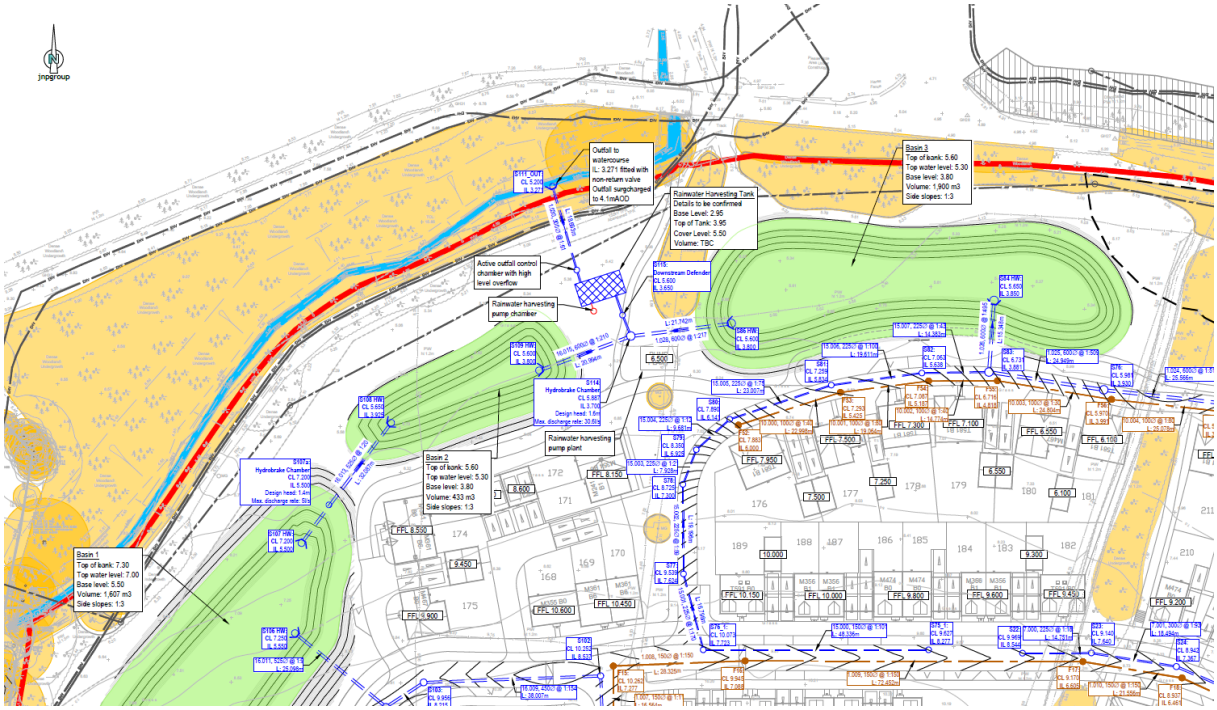
Assuming a generous water usage per person of 50 litres per day for a person employed in a warehouse or light industrial unit and applying the employment densities this would provide a daily average usage of 3,615 litres per day for mixed B8 storage and distribution and Class E(g)iii light industrial use (50/50 split).

Therefore, the water usage of the new units (3,615 l/p/d) would be a small fraction (20.4%) of those of the baseline poultry use (17,719.2 l/p/d) within the application buildings. There would also be a significant headroom of 14,104.2 l/p/d in the event that the units used more water than estimated.

Conclusion

Having regard to the above, the proposed commercial use of the former poultry buildings would be water neutral and would not result in any greater mains water usage than the existing agricultural use. In fact the proposals would positively reduce the water usage on the site from historic levels. This would be the case even if all of the buildings at the farm were converted to commercial uses. This water neutrality strategy also accounts for the worst case scenario in terms of water usage (given the significant headroom above) to ensure there is no harm to the aforementioned habitats.

5.7 Appendix B – Drainage layout (section)



Source: JNP (Drainage Strategy)

5.8 Appendix C – Schematic, stormwater harvesting system