PROMETHEAN
PLANNING

Oldfield Stables,
Fryern Road,
Storrington,
Pulborough,
West Sussex,
RH20 4BJ

Use of land for the stationing of a further 4 static caravans for residential purposes. New access on to highway. Associated landscape works. (part retrospective)

WATER NEUTRALITY REPORT

and

WATER MANAGEMENT PLAN

23rd August 2025

Prepared by Ben Kirk MSc

The Proposal

The proposal is for the use of land for the stationing of a further 4 static caravans for residential purposes

The site benefits from permission for 6 pitches granted under planning references DC/19/1558 DC/15/2815 and DC/12/2345 which have all been implemented.

There are in addition a number of other buildings on site, namely a storage building permitted under DC/10/2015, a day room permitted under DC/15/2815 and stables permitted under DC/09/0012

Water neutrality

The application site falls within the Sussex North Water Supply Zone, where increased demand for mains-water would exacerbate demand for the continued use/scale of public groundwater abstractions at Hardham Water Works contributing to associated adverse effect upon the integrity of the Arun Valley SAC, SPA and Ramsar sites.

Therefore, based on the evidence it is reasonable to conclude that, without mitigation, the proposal would result in an adverse effect on the integrity of the Arun Valley sites, either alone or in combination with other plans and projects.

The following sets out the water demand from the proposal and how this will be reduced by way of efficient fittings on the development and how this water demand will be met by way of a rainwater harvesting system which would provide for all of the sites water thus removing any potential for impact on the integrity of the Arun Valley SAC, SPA and Ramsar sites.

Baseline Water Consumption and Water reduction measures

The following summarises the flow rates for the fittings in the proposed units.

These have been achieved by the use of efficient fixtures and fittings in order to reduce the water demand.

- WC- 4/2 litre dual flush
- Kitchen sink tap with a flow rate of 1 litre per minute using flow restrictor valves
- Shower with a flow rate of 4 litre per minute
- Bathroom basin taps with a flow rate of 1 litre per minute using flow restrictor valves
- Dishwasher – 0.99 litres per place setting
- Washing machine – 6.43 litres / kg dry load

Using the above figures, the water usage can be calculated using a Part G water calculator as shown in Appendix 1

This demonstrates a water demand of 64.3 litres / person / day which includes an allowance of 5 litres per person per day for external water usage.

Census data has been used to estimate the average number of occupants (as per HDC guidance)

This sets out that the following occupancy rates should be used.

One-bedroom dwellings: 1.32 occupants
Two-bedroom dwellings: 1.88 occupants
Three-bedroom dwellings: 2.47 occupants
Four-bedroom dwellings: 2.86 occupants
Five-bedroom dwellings: 3.09 occupants.

The proposed units will be three bedroom and so a figure of 2.47 people should be used. Therefore, a total demand of 158.82 litres per day per unit

Reducing the water demand by way of Rainwater harvesting

Rainwater Harvesting is proposed to be installed to meet the water demand for non-potable water for outside use, washing machines and toilets

This would be used for the following water demand for each of the 4 new units

- External Use - 5 litres / person / day
- Washing machines - 13.5 litres / person / day
- Toilets 11.76 litres / person / day

A total therefore of 30.26 litres / person / day

The units will be three bedroom and so an occupancy figure of 2.47 people should be used.

Using the Part G water demand for water to be supplied by rainwater harvesting of 30.26 litres per person per day and a population size of 2.47 it is estimated that the total water usage per day which can be supplied by rainwater harvesting would be 74.74 litres per day per unit.

This would leave a mains water demand for each unit of 84.08 litres per day per unit (158.82 – 74.74)

With 4 units proposed this would equate to a mains water demand for which mitigation is required of 336.32 litres / day (further details of which are below)

In order to reduce the demand further it is proposed that Rainwater Harvesting is installed to meet the demand for non-potable water for outside use, washing machines and toilets for the existing Unit 1 and 2

This would be used for the following water demand for units 1 and 2

- External Use - 5 litres / person / day
- Washing machines - 17.85 litres / person / day
- Toilets 20.6 litres / person / day

A total therefore of 43.45 litres / person / day

The units are 3 bedroom and so an occupancy figure 2.47 people should be used.

Using the Part G water demand for water to be supplied by rainwater harvesting of 43.45 litres per person per day and a population size of 2.47 it is estimated that the total water usage per day which can be supplied by rainwater harvesting would be 107.32 litres per unit

This would leave a mains water demand of 121.68 litres per day per unit (336.32 – 107.32 – 107.32)

British Standard 16941-1:2018 (previously BS 8515:2009+A1:2013) provides guidance on rainwater harvesting.

The British Standard gives recommendations on the design, installation, testing and maintenance of rainwater harvesting systems and the methods of calculating the size of rainwater harvesting tanks.

The intermediate approach has been used to calculate the storage capacity.

This is based on a total available roof area from the outbuildings on the adjoining land of 217m2 plus the existing utility building with a roof area of 71m2 giving a combined roof area of 288m2.

The outbuildings buildings are shown within the blue line and so a condition can be used to control the implementation of the system.

The calculations for water demand and available yield are shown in Appendix 2

These calculations show the size of the rainwater harvesting system that would be required to meet the water demand for the development for a period of 35 day to ensure drought tolerance.

The calculations in Appendix 2 conclude that:

- The non potable water demand for the 4 proposed units and allowing for 35 days of drought tolerance would be 10,476 litres
- The total non potable water demand for the existing units 1-2 and allowing for 35 days of drought tolerance would be 7,521 litres

The total demand is therefore 17,997 litres

- The total available rainwater yield for the whole site based on available roof area of existing buildings in the applicants ownership and allowing for 35 days of drought tolerance would be 19,230 litres

It is clear that the available rainwater yield is in excess of the demand and so the developments' non potable water can be entirely supplied by way of rainwater harvesting subject to the quality of the supply being maintained (see below)

The site would therefore require a rainwater harvesting tank with a minimum storage capacity of 17,997 litres in order to ensure sufficient capacity to meet the demand of the development.

It is therefore proposed to install 2 x 10,000-litre potable rainwater harvesting tank. Details of the tank are shown in Appendix 4, a similar alternative with sufficient capacity may be used.

With this installed this would leave a mains water demand of 121.68 litres per day per unit (336.32 – 107.32 – 107.32)

Proposed mitigation

With the installation of the rainwater harvesting system for the non-potable water use there're would be a mains water demand for which mitigation is required of 121.68 litres per day

It is proposed that the two units that have not yet been installed will secure credits from the Councils mitigation scheme. It has been calculated that the total mains demand will be 84.08 litres per day per unit.

It is accepted that two of the units are retrospective and so cannot benefit from a Grampian condition, however the two units yest to be installed can be controlled by Grampian condition.

The Council have recently confirmed that Gypsy Traveller development will have access to the Councils' own mitigation scheme SNOWS.

It is understood that development deemed compliant with a current or emerging (post-submission) local plan or neighbourhood plan would be deemed eligible for access to purchasing SNOWS water credits.

Gypsy and Traveller proposals are considered to be eligible to access SNOWS to offset the increased water demand associated with the proposal.

It is proposed therefore a Grampian condition is applied to restrict the remaining two units from being brought on to site until such time that the requisite number of credits be secured through SNOWS.

This would equate to a further demand reduction of 168.16 litres per day (84.08 x 2)

This would result in a net reduction in water usage on site of 42.26 litres per day (121.68 – 168.16)

Thus, the development after the proposed mitigation would be water neutral.

Ensuring certainty of the supply to meet the demand

Based on the above figures it is clear that the rainwater harvesting system will meet the external water demand for the proposed development and will meet the required 35 days of storage, which will provide sufficient supply during periods of drought.

This will ensure that sufficient water is available at all times, even during extended periods of drought

Filtration Measures proposed to ensure water quality

The rainwater harvesting supply will undergo a process of filtration in accordance with BS EN 16941-1:2018, to ensure water quality is suitable for non-potable use.

The water will pass through leaf guards and a water filter which will remove coarse particles, upstream of the storage and fine particles will be retained by sedimentation and floatation.

The water will then be filtered depending on its final use with water used for laundry being treated with a separate UV filter to remove microorganisms.

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.

Annual water samples will be tested for the following in accordance with BS EN 16941-1:2018 :

- 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

Maintenance and Management Plan

Responsibilities.

The following sets out the long-term management and maintenance of the rainwater harvesting systems at the proposed development.

It is vital that the occupants have a robust inspection and maintenance plan for the lifetime of the development to ensure the quality and yield of the water being supplied ensuring that the proposed development will remain water neutral.

Industry guidance, such as that provided in BS EN 16941-1:2018 and manufacturers guidance has been used to provide the maintenance and management plan.

The occupants of the property should be aware of the system but it is expected that the occupants will enter in to a maintenance agreement with a company that has specialist knowledge of the systems. It is expected that as a minimum, the maintenance work will be carried out by a competent person who must have prior knowledge of the rainwater harvesting systems onsite.

Treatment of water supply.

Preliminary treatment such as leaf guards on gutters and a water filter will be provided prior to the water reaching the storage tank.

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.

Fine particles will be separated either by sedimentation or flotation to the water surface.

A calmed inlet will be incorporated in the tank to prevent the sediment being disturbed by the inflow of water. Removal of the sediment will be carried out on a 6 monthly basis.

A floating pump will be used to extract the water from the tank, set above the sediment level

Maintenance of the system

The annual maintenance inspection shall include:

- Inspection and cleaning of the tank
- Cleaning of gutters
- Inspection of filters
- Inspection of pumps
- Inspection of overflow areas
- Testing of the water supply

The results of the annual maintenance inspection and all sample testing shall be recorded and shall be kept with the property for the lifetime of the development.

Filters shall be changed on a 3 monthly basis.

Should further information be required with regards to the management and maintenance of the system this can be adequately controlled by way of a condition.

Contingency measures for system issues.

If a water sample failed, the point of use would be investigated by a British Water certified engineer

Drain down points for each water pipeline will be installed for ease of cleaning and sterilization.

Should the system fail, it would be investigated and repaired by a British Water certified engineer. This would likely mean that the system could be out of action for 7-10 days.

In these circumstances the occupants would seek a bulk supply of water sourced from outside the Arun Valley sites' catchment area to ensure sufficient water is available for all potable and non potable purposes.

It is not unreasonable to assume that occupants could seek a supply of water for the short period if the system were to fail and whilst it is repaired

Alternative approach

SNOWS is not live at the time of this submission, but it is anticipated that it may go live during the course of the application. The applicant therefore proposes that in the event that SNOWS is live before determination of the application that the requisite number of credits be secured through SNOWS as an alternative to the above bespoke mitigation measures for all 4 units.

Conclusion

This report confirms that the rainwater harvesting system proposed to be installed on the site would provide a certain sufficient yield to meet the non-potable water demands of the site.

The remaining water demand will be met by reducing the water usage of existing residential caravans on the wider site which are under the applicant's ownership and so can be controlled by condition.

This strategy will minimise the impact of the new development on the Sussex North Water Supply Zone. The Water Usage Strategy confirms the proposal will be water neutral once complete and therefore satisfies Natural England's requirements.

As such, there is no reasonable scientific doubt that the proposed development would be water neutral. The proposal would not result in an increase in water abstraction in the River Arun and Western Streams catchment of the Sussex North WRZ.

Therefore, it would not adversely affect the integrity of the Arun Valley SAC, SPA and Ramsar sites. Consequently, it would be consistent with Policy 31 of the HDPF which seek to protect the hierarchy of designated sites and habitats.

APPENDIX 1
Part G Water calculations

Proposed caravans

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
WC (single flush)	Flush Volume (litres)		4.42	0.00	0
WC (dual flush)	Full flush Volume (litres)	4	1.46	0.00	5.84
	Part flush Volume (litres)	2	2.96	0.00	5.92
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	1.00	1.58	1.58	3.16
Bath (where shower also present)	Capacity to overflow(litres)		0.11	0.00	0
Shower (where bath also present)	Flow Rate(litres / minute)		4.37	0.00	0
Bath Only	Capacity to overflow(litres)		0.50	0.00	0
Shower Only	Flow Rate (litres/minute)	4.00	5.60	0.00	22.40
Kitchen/Utility room sink taps	Flow rate (litres/minute)	1.00	0.44	10.36	10.80
Washing Machine	(Litres/kg dry load)	6.43	2.1	0.00	13.50
Dishwasher	(Litres/place setting)	0.99	3.6	0.00	3.56
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	**Total Calculated use (litres/person/day) =SUM(column 4)**			65.18
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			59.31
	(10)	External water use			5.0
	(11)	**Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)**			64.3

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Appendix 2

Water demand per unit and total available yield for rainwater harvesting calculations.

Water demand for non potable water – proposed units

Water Demand per unit	
Dn = Pd x n x 365 x (number of days of drought storage required/365)	
Dn is the water demand	
Pd is the daily water requirement per person (litres)	
n is the number of persons	
35 Day water demand calculations calculated at 9.6% (35/365) of the Annual water demand (litres) to account for 35 days of storage for periods of drought	
Pd (daily water requirement per person (litres))	30.26
n (number of persons)	9.88
Dn (water demand) in litres	10476

Water demand for non potable water – existing units 1-2

Water Demand per unit	
Dn = Pd x n x 365 x (number of days of drought storage required/365)	
Dn is the water demand	
Pd is the daily water requirement per person (litres)	
n is the number of persons	
35 Day water demand calculations calculated at 9.6% (35/365) of the Annual water demand (litres) to account for 35 days of storage for periods of drought	
Pd (daily water requirement per person (litres))	43.45
n (number of persons)	4.94
Dn (water demand) in litres	7521

Available yield – TOTAL

Available Yield TOTAL	
Yr = A x e x AAR x h x (365/number of days of drought storage required)	
Yr is the rainwater yield	
A is the collection area (m2)	
e is the yield coefficient	
AAR is the site specific annual average rainfall	
h is the hydraulic filter efficiency	
35 Day rainwater storage calculations calculated at 9.6% (35/365) of the Annual rainwater yield (litres) to account for 35 days of storage for periods of drought	
A (collection area (m2))	288
e (yield coefficient)	0.9
AAR (site specific annual average rainfall)	858.7
h (hydraulic filter efficiency)	0.9
Yr (rainwater yield) in litres	19230

Appendix 3

Average rainfall (mm) from nearest weather station

Climate period: 1991-2020

Station: North Heath

Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed at 10 m (knots)
January	8.55	2.52	–	55.25	92.33	–	–
February	9.02	2.24	–	83.04	63.49	–	–
March	11.74	3.44	–	117.86	52.58	–	–
April	14.83	4.64	–	170.19	52.57	–	–
May	17.61	6.99	–	205.07	46.86	–	–
June	20.65	9.68	–	199.60	55.92	–	–
July	23.31	11.77	–	215.93	63.28	–	–
August	22.99	11.58	–	196.60	63.61	–	–
September	19.93	9.46	–	148.17	63.38	–	–
October	15.89	7.06	–	109.26	103.33	–	–
November	11.89	4.40	–	66.22	103.13	–	–
December	9.20	2.62	–	54.06	98.22	–	–
Annual	15.50	6.39	–	1621.25	858.70	–	–

Appendix 4

Details of rainwater harvesting tank

BEST SELLER



10,000 LITRE UNDERGROUND POTABLE WATER STORAGE TANK

Product Ref: **VTP-1000**

CUSTOMER OFFLOADING | MDPE | ROUND | BELOW GROUND

Volume: **10000ltr**
Weight: **490.000kg**
Dimensions: **L:3980mm W:2180mm H:2540mm**
Lid Size: **450**

Estimated Lead time: 7-10 Working Days

Home Delivery
UK mainland delivery from £85.00 ex VAT

CHECK DELIVERY COST

Quantity: 1

£2,396.00 ex VAT
(£2,875.20 inc VAT)

PayPal Pay in 3 interest-free payments on purchases from £20-£3,000. Learn more

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Appendix 5

Part G calculations for the mitigation properties

Existing units 1-6

Water Calculator | WC | Taps (Other) | Taps (Kitchen/Utility) | Baths | Dishwashers | Washing Machines | Showers | H2O softeners | Greywater | Rainwater

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
WC (single flush)	Flush Volume (litres)		4.42	0.00	0
WC (dual flush)	Full flush Volume (litres)	6	1.46	0.00	8.76
	Part flush Volume (litres)	4	2.96	0.00	11.84
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	8.00	1.58	1.58	14.22
Bath (where shower also present)	Capacity to overflow(litres)		0.11	0.00	0
Shower (where bath also present)	Flow Rate(litres / minute)		4.37	0.00	0
Bath Only	Capacity to overflow(litres)		0.50	0.00	0
Shower Only	Flow Rate (litres/minute)	8.00	5.60	0.00	44.80
Kitchen/Utility room sink taps	Flow rate (litres/minute)	10.00	0.44	10.36	14.76
Washing Machine	(Litres/kg dry load)	8.50	2.1	0.00	17.85
Dishwasher	(Litres/place setting)	0.99	3.6	0.00	3.56
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	**Total Calculated use (litres/person/day) =SUM(column 4)**			115.79
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			105.37
	(10)	External water use			5.0
	(11)	**Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)**			110.4

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Appendix 7

Flow tests on mitigation properties

Old Field Stables
Fryern Road
Storrington
RH20 4BJ

Please see my findings at the above address,

Water flow rates recorded.

Caravan number 1

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Caravan number 2

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Caravan number 3

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Caravan number 4

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Caravan number 5

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Caravan number 6

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres

Day room

- Kitchen sink – 10Ltrs per minute
- Basin – 8ltrs per minute
- Shower – 8ltrs per minute
- Toilet dual flush 4/6 litres
-

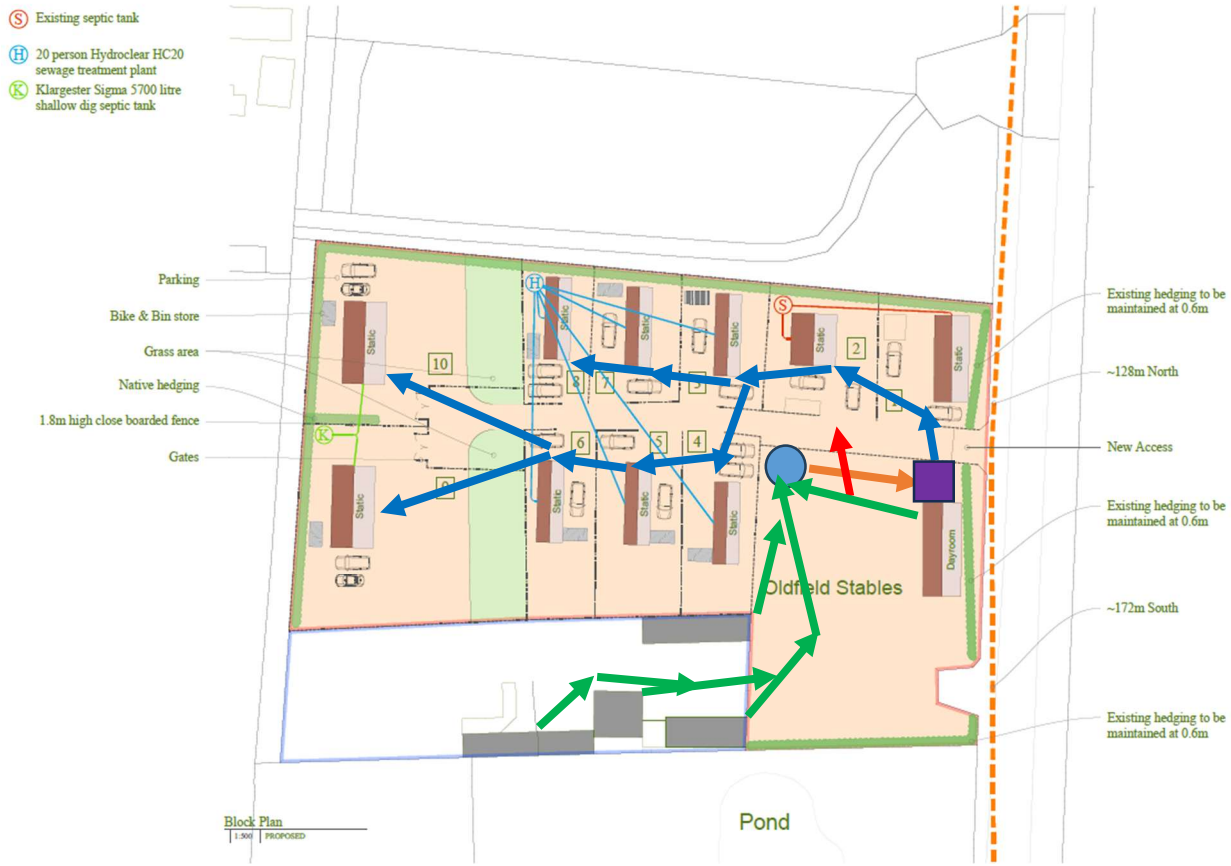
If you have any questions, please feel free to ask.
Sincerely,

Jon Ray
Heat Sussex LTD

Heat sussex LTD, company registration No. 13786270 29 Fletcher Way, Henfield, BN5 9FR T 07411732157 – 07787392257 E office@heat-sussex.co.uk

Appendix 8

Schematic of system



- **Rainwater downpipes with leaf guards and initial filtration plus underground drainage**
- **First flush diverter**
- **Potable underground rainwater harvesting tank with sedimentation and calmed inlet**
- **Return flow to treatment unit via pump set above sediment line**
- **Filtration**
- **Water distribution**