PJR

BUILDING SERVICES
DESIGN ENGINEERS

WATER NEUTRALITY REPORT

FOR

ST MARK'S COURT
CHART WAY
HORSHAM
RH12 1XL

Suite 29 Level 6
New England House
New England Street
Brighton
BN1 4GH
Tel: 01273 626247
Email: mail@PJRServices.co.uk

Date: June 2025
Ref: W19/01/WNR Ver 06

PJR
BUILDING SERVICES
DESIGN ENGINEERS

1.0 – EXECUTIVE SUMMARY

PJR Design Services has been appointed to produce a Water Neutrality Report for the proposed St Mark's Court, Horsham development. The planned development is the conversion of an existing occupied office building with an internal floor area of 13,461.30 m^2 to create a residential development comprising of:

58 No. Studio 1 Person Apartments

115 No. 1 Bed 2 Person Apartments

12 No. 2 Bed 3 Person Apartments

10 No. 2 Bed 4 Person Apartments

195 No. Residential Apartments in total.

With the current emphasis placed on water conservation, the Developer is keen to enhance the development's sustainability credentials.

Natural England defines water neutrality as 'the use of water in the supply area before the development being the same or lower after the development is in place', and also requests the following:

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets

The current use of the building is office accommodation with occupancy advised by the current tenant as an average of 1146 people per day for the period 2022/2023 and 2024, and 1065 for 2024 at the time of consent being granted, which it has been assessed using the BREEAM UK Wat 01 water efficiency calculator would provide a baseline for current water consumption of:

1146 people c. 55,455 L/day
1065 people c. 51,535 L/day

In order to achieve a significant improvement upon Part G performance targets, the Water Efficiency Calculator for New Dwellings for water efficiency by component type was used to estimate the expected flow rates of the sanitaryware fittings for the proposed development.

In accordance with these measures, the proposed development has an estimated expected occupancy of c. 364 and an estimated water consumption of:

c. 28,447.6 L/day

Therefore, in comparison with Part G Compliance performance targets for new dwellings of 125 litres/person/day, the proposed development provides an estimated annual water saving of:

c. 17,052.4 L/day

This equates to a c. 40% improvement when compared against the Part G water efficiency performance targets. This can be seen as a significant improvement upon the requirements stated in the Building Regulations Part G water efficiency of new dwellings.

In comparison to the assessed water usage of the existing building operating as providing office accommodation with a canteen, the proposed development provides an estimated water saving of:

c. 27,007.40 L/day with an average occupancy as office accommodation of 1146 people

c. 23,087.40 L/day with an average occupancy as office accommodation of 1065 people

2.0 – INTRODUCTION

PJR Design Services have been appointed to produce a Water Neutrality Report for the proposed St Mark's Court, Horsham development. Natural England defines water neutrality as 'the use of water in the supply area before the development being the same or lower after the development is in place', and also requests the following:

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets

The planned development is for a change of use for the existing office building to provide residential accommodation, comprising of:

58 No. Studio 1 Person Apartments

115 No. 1 Bed 2 Person Apartments

12 No. 2 Bed 3 Person Apartments

10 No. 2 Bed 4 Person Apartments

195 No. Residential Apartments in total, with an occupancy of 364 people.

This high-level report has been compiled to appraise the estimated water consumption of the proposed St Mark's Court, Horsham development. The Water Efficiency Calculator for new dwellings has been used to assess the efficiency of the domestic water-consuming components against a baseline consumption performance level used in Part G Building Regulations.

To this end, the proposed design shall promote reduced water usage by maximising efficiency through best-practice measures.

A separate planning application will be submitted on behalf of the developer relating to a proposed residential development located at Victoria Street, Horsham which may also reference this report for offsetting of water consumption.

3.0 – WATER USAGE

3.1 Assessment Methodology for Current Water Usage

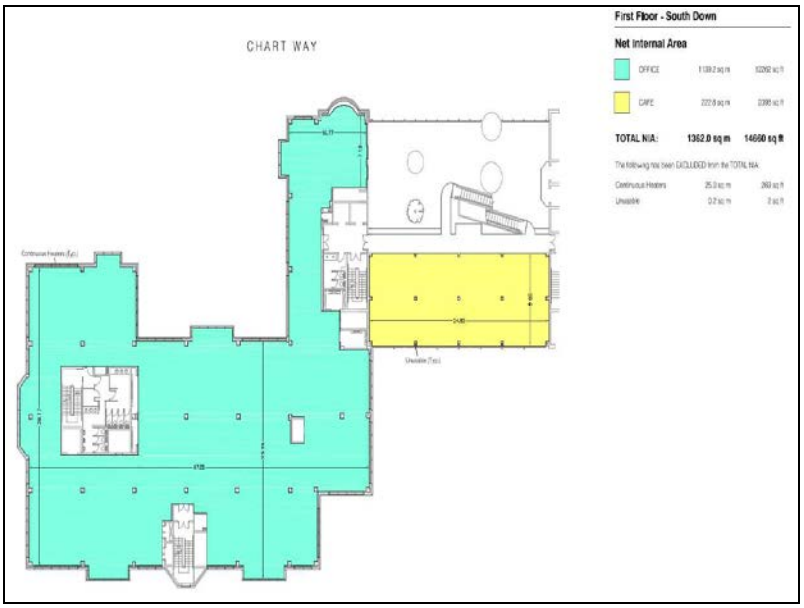
The site is currently occupied by an existing operational building of 13,461.30 m^2 providing office accommodation. The occupancy of the existing building has been advised by the current tenant, Royal Sun Alliance, as average of 1146 people per day for the period 2022/2023 and 2024, and 1065 for 2024 at the time of consent being granted. The table of occupancy provided by Royal Sun Alliance is contained within this report as Appendix 5.

Fig 1. Existing Building



The measured survey drawing of the existing building identifies that it is provided with a Café for staff use.

Fig 2. Existing First Floor Plan



The existing water consumption of the building has been assessed using the BREEAM UK Refurbishment and Fit Out 2014 Wat 01 Water consumption calculator.

The calculator uses the Floor Area of the building for cellular or open office space, which has been derived from the Plowman Craven area measurement report Issue A dated January 2013, which identifies the following office areas.

North Down (m^2)

Lower Ground Floor	647.9
Ground Floor	1641.1
First Floor	1650.3
Second Floor	1398.0
Third Floor	622.2
Total	5959.5 m^2

South Down (m^2)

Basement	1121.2
Lower Ground Floor	933.0
Ground Floor	1118.1
First Floor	1139.2
Second Floor	1354.0
Third Floor	889.5
Total	6555.0 m^2

A separate input is applied to the calculator for office staff canteen dining areas, which is defined within the Plowman Craven report as being 222.8 m^2 at first floor level.

A survey was undertaken on 21st October to establish details of the existing sanitary appliances and water consuming equipment provided within the building to be applied within the calculator, with flow rates at basin and kitchen taps with a water flow cup/weir gauge, capacity of WC cisterns recorded and manufacturers details of appliances recorded to enable water consumption to be determined.

The results from the BREEAM water consumption calculator are that the daily water consumption per person are 48.39 litres, with the contained within Appendix 1.

Based on an occupancy advised by the current tenant this would result in water usage as shown below:

1146 people c. 55,455 L/day

1065 people c. 51,535 L/day

3.2 Assessment Methodology for Proposed Water Usage

The predicted building water consumption for the proposed St Mark's Court, Horsham development has been calculated using the anticipated building occupancy and the estimated type and quantity of sanitaryware fittings.

The developer has advised that the allocation of sanitary appliances based on the different apartment types will comprise of:

58 No. Studio 1 Person Apartments

115 No. 1 Bed 2 Person Apartments

12 No. 2 Bed 3 Person Apartments

10 No. 2 Bed 4 Person Apartments

The base build for the apartments will include a for a washing machine to be provided and also a dishwasher to be provided within each dwelling, and these have been accounted for within the calculations.

Table 1. Proposed Development Sanitaryware Component data

Accommodation Type	Component Types				
	WHB	WC	SINK	SHWR	BATH
Studio (Bath)	33	33	33	0	33
Studio (Shower)	26	26	26	26	0
1 Bed Flat	110	110	110	0	110
2 Bed Flat (Ensuite)	32	32	16	16	16
2 Bed Flat	6	6	6	0	6
2 Bed Flat (2 Bathrooms)	8	8	4	0	8
Totals	215	215	185	42	173

In order to measure the efficiency of the anticipated domestic water-consuming components in the proposed development, the Water Efficiency Calculator for New Dwellings was used which is a Part G calculation methodology. This calculator uses the Government's methodology for assessing the whole house water efficiency of new dwellings. The calculation method is to be used to assess compliance against the water performance targets in Building Regulations Part G (Table 3).

Table 3. Building Regulations Part G performance target

Performance Target	Maximum Consumption (litres/person/day)
Part G Compliance	125

Based on an occupancy of the building with residential use of 364 people with the permissible water consumption of 125 litres/person/day this would equate to:

c. 45,500.00 L/day

The calculation method requires the use of water consumption figures provided from manufacturers' product details. Before the assessment can be carried out, figures will need to be collected from manufacturers' product information to determine the consumption of each terminal fitting.

Given that the specifications of the sanitaryware fittings for the proposed development are yet to be confirmed, the following figures have been applied, and it has been confirmed by the Developer that these will be achieved through the specification of the sanitary fitments.

Type	Description	Flow rates, volumes etc.
Taps	Taps	6 litres/min
Baths	Baths	100 litres to overflow
Dishwashers	Dishwasher	1.25 litres/place
Washing Machines	Washing Machines	7 litres/kg
Showers	Showers	6 litres/min
WC's	Toilets	4/3 litres flush vols.
Kitchen/Utility taps	Taps	6 litres/min

To further enhance the water efficiency of the proposed development consideration has been given to the incorporation of rainwater recovery and greywater recovery. The assessment has indicated that there is no benefit of introducing both systems, and therefore the Water Efficiency Calculator has been based on rainwater recovery being adopted based on the BS8515 Intermediate approach being adopted and applying the MET Office annual rainfall data as Appendix 4, which contributes a saving of 13.3 litres/person/day.

The Water Efficiency Calculator for New Dwellings has indicated a water consumption for dwellings with baths of 80.2 litres/person/day and dwellings with showers of 76.9 litres/person/day.

Based on the accommodation schedule for the proposed development this would result in the following:

26 No. Studio apartments with bathrooms – 26 occupants @ 80.2 litres/person/day = 2085.2 l

32 No. Studio apartments with shower rooms – 32 occupants @ 76.9 litres/person/day = 2460.8 l

110 No. 1 Bed Apartments with bathrooms – 220 occupants @ 80.2 litres/person/day = 17,644.0 l

16 No. 2 Bed Apartments with ensuites – 48 occupants @ 76.9 litres/person/day = 3691.2 l

6 No. 2 Bed Apartments with bathroom and ensuite – 24 occupants 80.2 litres/person/day = 1924.8 l

4 No. 2 Bed Apartments with 2 bathrooms – 8 occupants @ 80.2 litres/person/day = 641.6 l

Based on an occupancy of the building with residential use of 364 people with the calculated water consumption this would equate to:

c. 28,447.6 L/day

External

Accounting for external maintenance and landscaping, a usage of 5 litres per person per day has been allowed for as per the recommendations of the Part G calculator tool, resulting in an additional 2110L per day. However, an external use allowance of 5 litres per person per day is likely to be a gross overestimation when considering the majority of the external areas are "hard" landscaped. The only "soft" external area is the grassed verge that will not require watering.

The Part G Compliance Reports produced using the Water Efficiency Calculator for New Dwellings methodology are contained within Appendix 2 & 3.

4.0 – RAINWATER RECOVERY SYSTEM

The rainwater recovery system shall collect surface rainwater from the roof areas of the building and convey this by gravity to the rainwater recovery storage tank to be located within the lower ground floor plant room of the building on the Park Street side.

The gravity rainwater collection system shall provide treatment of the collected water prior to this being transferred to the storage tank by the use of leaf guards on gutters and a leaf guard on the pipework prior to the point of connection to the storage tank. Any fine particles that are not removed by the primary filtration will settle on the base of the storage tank or by flotation to the surface of the stored water, with the inlets to the storage tank being arranged as calmed inlets to prevent the fine particles at the bottom of the tank being circulated into the main stored water volume by turbulation.

The rainwater recovery tank will be dual compartment to enable each compartment to be isolated from the system to enable planned preventative maintenance, cleaning and removal of fine particles, with the non-isolated compartment enabling the system to remain in operation during maintenance and cleaning activities.

The storage tank will be of hot pressed glass reinforced plastic (GRP) pre-insulated sectional panels to enable the tank to be constructed in-situ by the manufacturer, and incorporating hinged manway access hatches with internal and external stainless steel ladders for maintenance access and to facilitate internal cleaning.

To cater for periods of low rainfall the system shall incorporate an automatic mains cold water backup to ensure the system remains in operation when there is inadequate recovered rainwater stored within the tank. The back up system will comprise of a solenoid valve on the mains cold water supply operated by a control panel with low level sensors positioned within both compartments of the storage tank to automatically provide mains cold water to the storage tank as required.

From the dual compartment storage tanks pipework will be conveyed from a level above the base of the tank where fine particles have settled, and pass through an inline strainer to provide further protection from particulates being introduced to the distribution system.

Further treatment of the recovered rainwater will be provided by an ultra violet (UV) disinfection filter to kill any bacteria or microorganisms, with this being located on the common pipework outlet from the storage tank.

The recovered rainwater will be distributed by a packaged cold water booster pump set, with multiple pumps arranged as duty/assist/standby and an accumulator vessel to address periods of low demand and prevent pump operation. The pumps will be inverter driven to enable the delivered flow rate to match varying system demands and provide automatic pump changeover from failed duty to standby.

From the packaged cold water booster pump set a dedicated pipework distribution system shall be installed to convey treatment recovered rainwater to serve the WC's and washing machines within each dwelling, with isolation and pressure reducing valves on the pipework distribution system as necessary. The recovered rainwater pipework shall be thermally insulated and clearly identified in accordance with BS 1710 and BS EN 16941.

A separate category 5 packaged break tank and cold water booster pump set shall be provided to serve any irrigation of the limited landscape areas of the site as required.

Due to the volume of water being stored the rainwater recovery system storage tank shall be provided with a warning pipe to provide early indication of overflow and an overflow pipe from each of the tank compartments.

Automatic detection of both high and low water levels within each section of the dual compartment tank shall be provided, with a beacon and sounder to alert of an overflow condition being present to enable this to be investigated by the maintenance personnel.

The rainwater recovery system shall be maintained, together with water quality testing as required, in accordance with BS EN 16941.

The rainwater recovery system design is indicated on drawing no. W19/03/101 contained within Appendix 5.

5.0 – CONCLUSION

This high-level report has been compiled to appraise the water consumption efficiency of the proposed St Mark's Court, Horsham development using Part G Calculation Methodology.

The predicted water consumption efficiency for the proposed development using the Water Efficiency Calculator for New Dwellings (Building Regulation 17.K) is shown below:

c. 80.2 litres/person/day for dwellings with baths

c. 76.9 litres/person/day for dwellings with showers

Therefore, in comparison with Part G Compliance performance targets for new dwellings, the proposed development provides an estimated annual water saving of:

c. 17,052.4 L/day

This equates to a c. 40% improvement when compared to the Part G Compliance target. This can be seen as a significant improvement upon the requirements stated in the Building Regulations Part G water efficiency of new dwellings.

In comparison to the assessed water usage of the existing building operating as providing office accommodation with a canteen, the proposed development provides an estimated water saving of:

c. 52,944.38 L/day

Appendices

Appendix 1 – BREEAM UK Wat 01 Water Efficiency Calculator

Appendix 2 - Part G Compliance Report A – Dwelling with Bath

Appendix 3 - Part G Compliance Report B – Dwelling with Shower

Appendix 4 – MET Office Annual Rainfall Data

Appendix 5 – Drawing No. W19/03/101 Rainwater Recovery System & Details

Appendix 6 – Existing Building Occupancy as advised by Royal Sun Alliance

PJR
BUILDING SERVICES
DESIGN ENGINEERS

Appendix 1

BREEAM UK Wat 01 Water Efficiency Calculator

PJR
BUILDING SERVICES
DESIGN ENGINEERS

BREEAM UK Wat 01 Water Efficiency Calculator

BREEAM UK Refurbishment and Fit-out 2014 Wat 01 Water consumption: Water efficiency calculator

BREEAM UK

Building details

Building name	St Marks Court Horsham
BRE assessment reference no.	

Building type	Description of building type	Default occupancy	Default annual days/operation	Default daily hours of operation
Office	TCP Classification B1: Offices and workshop business (including those with a basic (category 1) laboratory area)	1399,01654	253	10

Main building activity areas	Description of activity area	Activity area present in building?	Net Floor Area (m^2)
Office - Office areas	Cellular or open plan office space, including staff kitchen where present/adjacent and reception areas. Exlcude meeting rooms, visitor waiting or circulation areas.	Yes	12514,5
Office - Small workshop /laboratory space	Small scale workshop or category 1 laboratory area	No	
Office - Staff canteen dining area	Seated dining areas that accompany a permanently staffed kitchen preparing food for consumption on the premises (excludes small un-staffed kitchen's used by office staff to re-heat food, make tea etc.)	Yes	228,8
Office - Fitness suite/gym (with changing facility and showers)	A fitness suite or gym that is part of the office building/development and used by the building's employees only. The gym will have its own changing facility with showers.	No	

Water consumption - building microcomponent

WC component - all activity areas	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
WC - male (urinals installed)	Effective flush volume (Litres)	9,00	1,00	1,00	4,50
WC - female	Effective flush volume (Litres)	9,00	4,00	1,00	18,00

Urinal component - all activity areas	units	Specification	No. of cisterns	Flushing frequency (flushes/hour)	Consumption (L/person/day)
Automatically operated flushing cistern	Cistern capacity (Litres)	9,00	14,00	4,00	3,60
	No. of urinal bowls	3,00			
	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Manual/automatic operated pressure flushing valve (all activity areas)	Flush volume (litres)		3,00	1,00	0,00
	No. of urinal bowls				
	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Waterless urinals (all activity areas)	Flush volume (litres)	Waterless urinals - not specified	3,00	1,00	0,00
	No. of urinal bowls				

	units	Specification	Usage/person/day	Usage factor	Consumption (L/person/day)
Taps components (personal hygiene) - all activity areas					
Wash hand basin taps	Flow rate (litres/min)	16,00	4,00	0,25	10,83
Shower use	Flow rate (litres/min)	11,00	0,030	5,60	1,85
Fixed use - vessel filling	Litres/person/day	-	-	-	1,58
Tap components (cleaning) - staff kitchenette					
Kitchen taps - kitchenette	Flow rate (litres/min)	12,00	1,00	0,67	5,44
Dishwasher	Litres/cycle	10,00	0,04	1,00	0,40
Tap components (cleaning and food preparation) - staff canteen food preparation area					
Kitchen taps - pre-rinse nozzle	Flow rate (litres/min)	12,00	-	60,00	0,51
Dishwasher	Litres/rack	11,00	-	0,217	0,39
Waste disposal unit	Flow rate (litres/min)		-	30,00	0,00
Fixed use - food preparation	Litres/person/day	-	-	-	0,38
Fixed use - kitchen cleaning	Litres/person/day	-	-	-	0,90

	Wat01 component consumption (L/person/day)
Total	48,39

PJR
BUILDING SERVICES
DESIGN ENGINEERS

Appendix 2

Part G Compliance Report A – Dwelling with Bath

PJR
BUILDING SERVICES
DESIGN ENGINEERS

PART G COMPLIANCE REPORT A

PROJECT DETAILS

Project Reference:	**ST MARKS COURT** DWELLING WITH BATH & RAINWATER RECOVERY
Client:	WeBuild Sussex Ltd
Property:	St Marks Court Chart Way Horsham RH12 1XL
Local Authority:	Horsham District Council
Date:	January 2025

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this dwelling, as designed, achieves a water consumption of 80.2 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Key elements of the design include:
Rainwater harvesting system apportioned to this dwelling
BS8515 Intermediate approach adopted

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	0
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	3	2.96	0.00	8.88
WC(multiple fittings)	Average effective Flush vol. (litres)		4.42	0.00	0
Taps(excl. Kitchen)	Flow rate (litres/min)	6	1.58	1.58	11.06
Bath (shower also present)	Capacity to overflow (litres)	100	0.11	0.00	11
Shower (bath also present)	Flow rate (litres/min)	6	4.37	0.00	26.22
Bath only	Capacity to overflow (litres)	0	0.50	0.00	0
Shower only	Flow rate (litres/minute)	0	5.6	0.00	0
Kitchen sink taps	Flow rate (litres/minute)	6	0.44	10.36	13
Washing Machine	litres/kg dry load	7	2.1	0.0	14.7
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0

Total calculated use (litres/person/day)	95.93
Contribution from greywater (litres/person/day)	-
Contribution from rainwater (litres/person/day)	- 13.3
Normalisation factor	0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)	**75.2**
External water use	5.0
Total Water Consumption. (36(1)) (litres/person/day)	**80.2**

Table 5.1: Rainwater collection. BS8515 Intermediate approach	
Collection area (sqr. m)	3832
Yeild co-efficient and hydraulic filter efficiency	0.7
Rainfall (average mm/year)	752.61
Daily rainwater collection (litres)	5613.93
Number of occupants	422
Daily rainwater collected per person (litres)	13.3

Table 5.5: Rainwater saving calculation for New Dwellings	
	Litres per person per day
Rainwater collected	13.3
Rainwater demand	30.15
Rainwater savings	13.3

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps		6 litres/min	1
Baths		100 litres to overflow	1
Dishwashers		1.25 litres/place	1
Washing Machines		7 litres/kg	1
Showers		6 litres/min	1
WC's		4.5 / 3 litres flush vols.	1
Kitchen/Utility taps		6 litres/min	1

PJR
BUILDING SERVICES
DESIGN ENGINEERS

Appendix 3

Part G Compliance Report B – Dwelling with Shower

PJR
BUILDING SERVICES
DESIGN ENGINEERS

PART G COMPLIANCE REPORT B

PROJECT DETAILS

Project Reference:	**ST MARKS COURT** DWELLING WITH SHOWER & RAINWATER RECOVERY
Client:	WeBuild Sussex Ltd
Property:	St Marks Court Chart Way Horsham RH12 1XL
Local Authority:	Horsham District Council
Date:	January 2025

RESULT SUMMARY

By following the Government's national calculation methodology for assessing water efficiency in new dwellings this dwelling, as designed, achieves a water consumption of 76.9 litres per person per day.

Compliance with Building Regulation 36(1) has been demonstrated.

Key elements of the design include:
Rainwater harvesting system apportioned to this dwelling
BS8515 Intermediate approach adopted

Table 1: The Water Calculator for New Dwellings

Installation Type	Unit of measure	Value	Use factor	Fixed use	litres/person/day
WC(single flush)	Flush volume (litres)		4.42	0.00	
WC(dual flush)	Full flush vol.	4.5	1.46	0.00	6.57
	Part flush vol.	3	2.96	0.00	8.88
WC(multiple fittings)	Average effective Flush vol. (litres)		4.42	0.00	
Taps(excl. Kitchen)	Flow rate (litres/min)	6	1.58	1.58	11.06
Bath (shower also present)	Capacity to overflow (litres)	0	0.11	0.00	0
Shower (bath also present)	Flow rate (litres/min)	0	4.37	0.00	0
Bath only	Capacity to overflow (litres)	0	0.50	0.00	0
Shower only	Flow rate (litres/minute)	6	5.6	0.00	33.6
Kitchen sink taps	Flow rate (litres/minute)	6	0.44	10.36	13
Washing Machine	litres/kg dry load	7	2.1	0.0	14.7
Dishwasher	litres/place setting	1.25	3.6	0.0	4.5
Waste disposal	litres/use	0	3.08	0.0	0
Water softener	litres/person/day	0	1.0	0.0	0

Total calculated use (litres/person/day)	92.31
Contribution from greywater (litres/person/day)	-
Contribution from rainwater (litres/person/day)	- 13.3
Normalisation factor	0.91
Total Water Consumption. Code for Sustainable Homes (litres/person/day)	**71.9**
External water use	5.0
Total Water Consumption. (36(1)) (litres/person/day)	**76.9**

Table 5.1: Rainwater collection. BS8515 Intermediate approach	
Collection area (sqr. m)	3832
Yeild co-efficient and hydraulic filter efficiency	0.7
Rainfall (average mm/year)	752.61
Daily rainwater collection (litres)	5613.93
Number of occupants	422
Daily rainwater collected per person (litres)	13.3

Table 5.5: Rainwater saving calculation for New Dwellings	
	Litres per person per day
Rainwater collected	13.3
Rainwater demand	30.15
Rainwater savings	13.3

Summary of fitting types "As Designed"			
Type	Description	Flow rates, volumes etc.	Qty
Taps		6 litres/min	1
Dishwashers		1.25 litres/place	1
Washing Machines		7 litres/kg	1
Showers		6 litres/min	1
WC's		4.5 / 3 litres flush vols.	1
Kitchen/Utility taps		6 litres/min	1

Appendix 4

MET Office Annual Rainfall Data

Average tables | Average graphs | Location comparison | Average maps

Climate period: 1991-2020

Station: Shoreham Airport

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	8.19	2.37	9.03	–	80.45	12.71	10.06
February	8.37	2.25	7.88	–	56.70	10.27	9.70
March	10.48	3.56	3.90	–	45.66	9.04	9.27
April	13.12	5.15	1.77	–	45.13	9.11	8.64
May	16.31	8.11	0.00	–	45.93	8.33	8.86
June	19.08	10.95	0.00	–	46.68	7.74	8.46
July	20.94	13.02	0.00	–	54.18	7.63	8.57
August	21.03	13.06	0.00	–	56.73	8.46	8.36
September	18.92	10.92	0.00	–	59.13	8.23	8.52
October	15.49	8.38	0.40	–	82.20	11.57	9.13
November	11.61	5.21	2.97	–	90.37	13.12	9.55
December	8.87	2.81	8.15	–	87.45	12.62	9.86
Annual	14.40	7.18	33.10	–	752.61	118.83	9.08

PJR
BUILDING SERVICES
DESIGN ENGINEERS

Appendix 5

Existing Occupancy as advised by Royal Sun Alliance

Site	St. Mark's Court, Horsham			
	2022	2023	2024	2025
Attendees (Per Day)	1 182	1 191	1 065	919

Week	AVG per DAY
2022-37	1 261
2022-38	1 167
2022-39	1 088
2022-40	1 251
2022-41	1 221
2022-42	1 380
2022-43	1 266
2022-44	1 018
2022-45	1 346
2022-46	1 145
2022-47	1 238
2022-48	1 241
2022-49	1 214
2022-50	1 427
2022-51	978
2022-52	666
2023-01	148
2023-02	775
2023-03	1 398
2023-04	1 337
2023-05	1 525
2023-06	1 273
2023-07	1 333
2023-08	1 184
2023-09	1 488
2023-10	1 373
2023-11	1 270
2023-12	1 269
2023-13	1 355
2023-14	1 386
2023-15	934
2023-16	925
2023-17	1 450
2023-18	1 383
2023-19	1 105
2023-20	1 078
2023-21	1 268
2023-22	1 308
2023-23	836
2023-24	1 201
2023-25	1 216
2023-26	1 390
2023-30	1 321
2023-31	1 286
2023-32	1 121
2023-33	1 083
2023-34	1 117
2023-36	898
2023-35	1 116
2023-37	1 212
2023-38	1 466
2023-39	1 217
2023-40	1 269
2023-41	1 208
2023-42	1 243
2023-43	1 191
2023-44	1 120
2023-45	1 213
2023-46	1 231
2023-47	1 197
2023-48	1 236
2023-49	1 113
2023-50	1 268
2023-51	1 279
2023-52	744

2024-01	1 140
2024-02	1 165
2024-03	1273
2024-04	1230
2024-05	1301
2024-06	1221
2024-07	1166
2024-08	1184
2024-09	1061
2024-10	1083
2024-11	1104
2024-12	1056
2024-13	1023
2024-14	1089
2024-15	1114
2024-16	1093
2024-17	1034
2024-18	1064
2024-19	1041
2024-20	1097
2024-21	1103
2024-22	1134
2024-23	1125
2024-24	1114
2024-25	1077
2024-26	1063
2024-27	1022
2024-28	1001
2024-29	996
2024-30	1023
2024-31	1076
2024-32	1103
2024-33	1007
2024-34	1102
2024-35	1035
2024-36	1022
2024-37	1014
2024-38	1090
2024-39	1043
2024-40	994
2024-41	1006
2024-42	1031
2024-43	1052
2024-44	1022
2024-45	987
2024-46	988
2024-47	991
2024-48	973
2024-49	950
2024-50	965
2024-51	901
2024-52	843
2025-01	873
2025-02	965
2025-03	944
2025-04	974
2025-05	943
2025-06	901
2025-07	924
2025-08	936
2025-09	911
2025-10	884
2025-11	898
2025-12	875

RSA INSURANCE GROUP LTD.
22 Bishopsgate, London EC2N 4BQ
Company No: 0233582

PJR
BUILDING SERVICES
DESIGN ENGINEERS

Appendix 6

Drawing No. W19/03/101 Rainwater Recovery System & Details

PIPEWORK NOTES

Copper Pipe

Copper pipework shall be manufactured in accordance with the provisions of EN1057 R250 and BS 2871:1971 and subsequent amendments Table X. All pipe and fittings shall bear an appropriate mark to indicate that it has been manufactured in accordance with the provisions of the BSS.

Copper Capillary and Compression Fittings

Capillary fittings for use with copper pipe shall be of an approved soldered type with internal shoulders and incorporating the necessary solder integral with the fitting.

They shall be manufactured in accordance with the provisions of EN1254 and BS 864 "Capillary and Compression Tube Fittings of Copper and Copper Alloy" Part 2:1971 "Metric Units" and subsequent amendments and the joints shall be made in accordance with the manufacturers instructions with regard to cleaning, tinning, flux and the application of heat.

Compression fittings for use with copper pipe shall be of an approved manipulative type manufactured in accordance with the provisions of BS 864: Part 2:1971 and subsequent amendments Type A or Type B as specified for the service concerned.

All necessary copper to iron adaptors for connections to valves and other equipment, shall be provided.

Gunmetal fittings shall be used when specified for the service concerned. Capillary or compression fittings for use under conditions where de-zincification of the alloy is liable to be experienced shall be of gunmetal or other zinc less alloy.

Where pipework is to be chromium plated, compression fittings shall be used and shall be Type B.

Pipework Supports

All necessary brackets, clips, hangers, and other pipe supports including bolts, nuts, washers, backing plates, screws and plugs which shall be provided for the fixing and alignment of all pipework.

All pipework shall be supported at the maximum centres given in the schedule indicated. In the event of two or more pipes being carried by a single support the spacing shall be selected for the shorter interval.

Under no circumstances shall a larger pipe be supported from a smaller pipe.

Pipework support distances in metres shall be:

Nominal bore of pipe (mm)	Steel		Copper	
	Vertical	Horizontal	Vertical	Horizontal
15	2.0	2.0	1.5	1.5
20	2.5	2.5	1.5	1.5
25	2.5	2.5	1.5	1.5
32	2.5	2.5	1.5	1.5
40	3.0	3.0	2.0	2.0
50	3.5	3.5	2.0	2.0

All supports for copper pipes shall be of polished brass where exposed to view; elsewhere, they shall be rough finish. No ferrous supports will be permitted for non-ferrous pipes.

Where copper piping is normally exposed to view in occupied places, the supports shall be spaced at intervals one-half of those listed above.

Pipe Sleeves

In all cases where pipes pass through walls, floors, ceilings and footings, sleeves shall be provided and it shall be ensured that the sleeves are correctly built in. Sleeves shall in no case be used as pipe supports.

Sleeves in load-bearing walls or footings shall be cast iron pipe. Sleeves in non load bearing walls, floors, ceilings and partitions shall be in copper or mild steel to suit the particular pipe material.

Inside diameter of sleeves shall not be less than 12mm larger than the outside diameter of the pipe, except where pipes pass through load bearing walls or footings where sleeves shall be 100mm larger than the outside diameter of the pipe.

Valves

Ball type isolating valves shall be provided at each sanitary appliance and item of equipment.

Drain valves shall be provided at all low points to enable the entire system to be drained.

THERMAL INSULATION NOTES

General

The thermal insulation work shall not be commenced, unless otherwise approved in writing, until the whole of the installation has been completed and tested as set out in the relevant pipework, plant and air distribution sections of the specification.

All exposed insulation faces (e.g. flanges, valves etc) shall be capped with aluminium 'In-Ends' or similar.

All thermal insulation work shall be carried out with no form of 'heat bridge' being present, which would affect the finish of the insulation. All insulation damaged or subject to failure due to 'heat bridging' shall be replaced.

All thermal insulation to pipework conveying cold fluids shall be continuously vapour sealed.

Under no circumstances shall pipes be married together with insulating material.

Heating, hot water, cold feed, cold water main, cold water down service and open vent pipe work shall be individually insulated and finished with bright aluminium foil facing.

The sections shall be applied in lengths, cut longitudinally into two halves securely taped on with 25mm wide self-adhesive PVC tape & aluminium clad.

The pipework thermal insulation shall be Kooltherm FM Silver Zero ODP 35 kg/m3 CFC-HCFC free rigid phenolic insulation with a class O fire rating with phenolic spacer blocks at brackets around the pipe as manufactured by Kingspan Insulation.

All flanges and valves shall be fitted with purpose made removable bags/muffs with Velcro fasteners.

TABLE OF BCW INSULATION THICKNESS

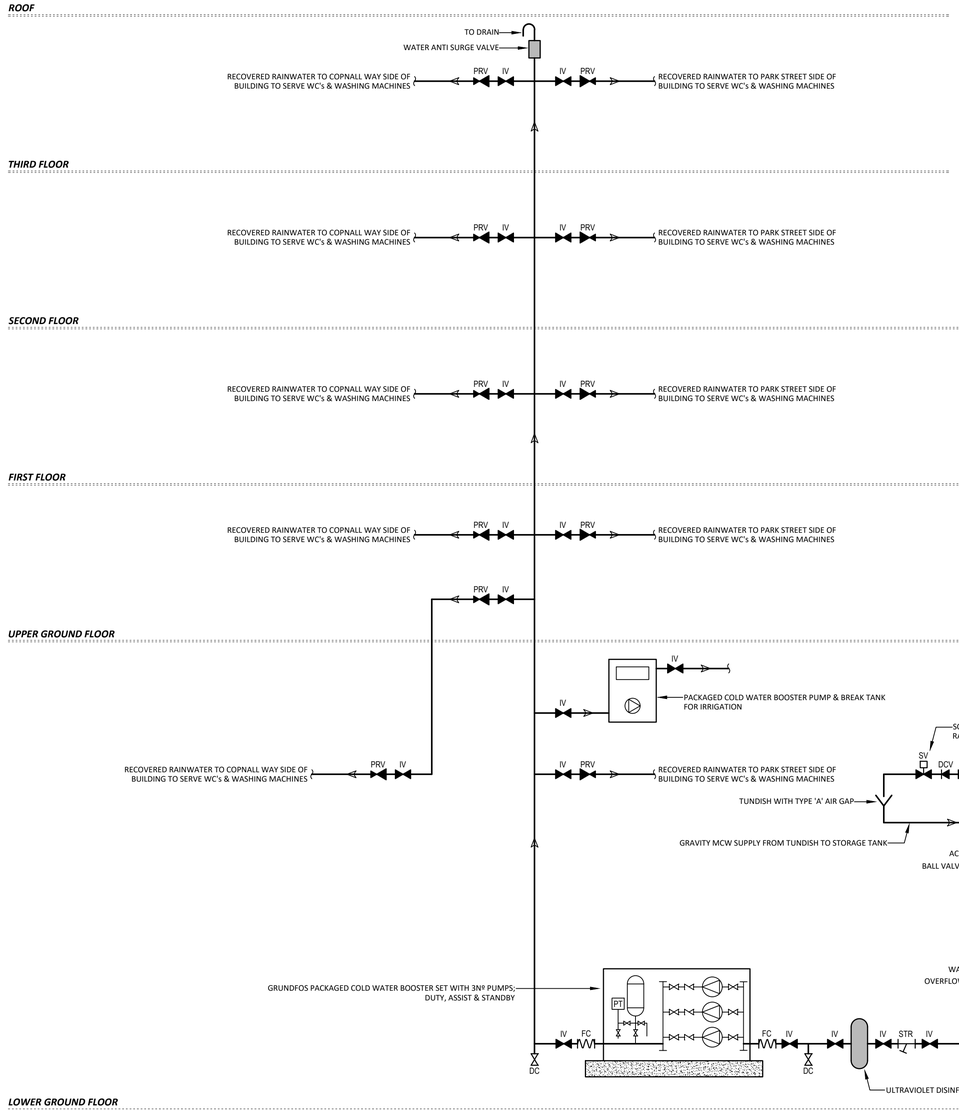
Nominal bore of pipe (mm)	Insulation thickness (mm)
15	20
22	20
28	25
35	25
42	25
54	25
67	30

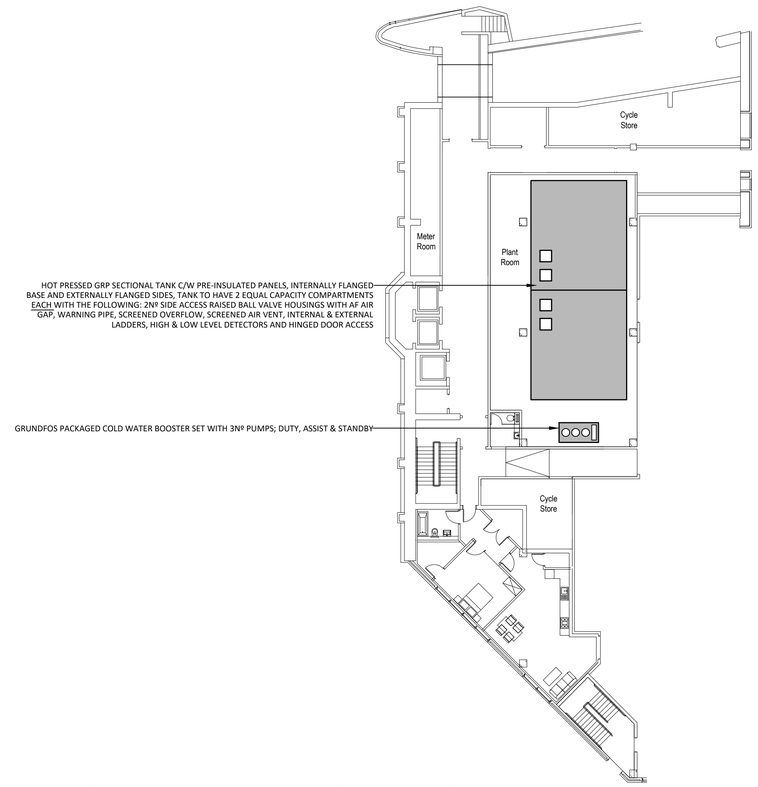
BOOSTER PUMP SET SPECIFICATION

Quantity	1
Description	Fully packaged, variable speed unit featuring WRc multistage pumps with in-built inverter drives. Stainless steel suction & discharge manifolds with isolating valves on the suction & return and non return valves on the discharge of each pump. Starter panel consisting of IP55 enclosure (See details below) & remote mounted hydraulic accumulator
Control Panel	Automatic variable speed control by microcontroller; Pressure measurement by 392 transducer; Automatic alteration of all pumps; Adjustable pump run-on timer; Sequential pump starting; Hand/Off/Auto switches for each pump; Motor overload protection; Electornic low water protection; Interlocked door isolator; RE-PRESS Power Restoration Protection; RS232/485 serial communication port; Data logging function, indicators for pumps run, hand, off and auto; Fascia mounted keyboard for entering/retrieving data and system parameters; Illuminated 2 line LCD display for pressure, faults and information including Power On, System Working Prtessure, System Status, Low System Pressure, High System Pressure, Pump Hours Run, Pump Failed, Transducer Failed and Service Reminder; 8 BMS Volt Free Contacts: High/Low Water, Low Pressure, High Pressure, Frequency of Starts, Transducer Failed, Pump Fail, Common Warning, System Healthy; All enclosed in a sheet steel housing with locable door to IP55.
Pump Arrangement	3Nº pumps - duty - assist (run / assist / standby)
Pump Model	Vertical Multistage
Electrical Supply	415V 50Hz 3 phase, 2.2kW per pump, 14.0A FLC
Pipework Header	304L stainless steel
Accessories	AV mounts, flexible connections & Aquavent

DOMESTIC SERVICES VALVE SCHEDULE

Service	Model/Type	Manufacturer
Cold Water		
Appliance Isolation	107 96	Oventrop
Isolation	107 91 / 107 95	Oventrop
Strainer	112 00 / 112 20	Oventrop
Check	107 50 / 107 30 / 107 25	Oventrop
Drain Plantroom	103 33	Oventrop
Drain Elsewhere	103 35	Oventrop
Mains Cold Water		Oventrop
Appliance Isolation	107 96	Oventrop
Isolation	YP501 DZR/GM	Yorkshire
Strainer	112 00 / 112 20	Oventrop
Check	107 50 / 107 30 / 107 25	Oventrop
Drain Plantroom	103 33	Oventrop
Drain Elsewhere	103 35	Oventrop





PART LOWER GROUND FLOOR PLAN PARK STREET SIDE OF BUILDING (1:200)

LEGEND OF ABBREVIATIONS/KEY

IV	ISOLATION VALVE
SC	STOP COCK
PRV	PRESSURE REDUCING VALVE
DCV	DOUBLE CHECK VALVE
DC	DRAIN COCK
SV	SOLENOID VALVE
FC	FLEXIBLE CONNECTION
STR	STRAINER

GENERAL CONSTRUCTION NOTES:

1. All plant & equipment shall be installed in accordance with the manufacturers recommendations.
2. All works shall be generally in accordance with employers requirements.
3. The entire works shall comply in all respects with all relevant statutory instruments & regulations including the following:
   - Health & Safety at Work, etc Act.
   - Health & Safety Executive publications.
   - British Standards, relevant European & International Standards.
   - The Requirments for Electrical Installations, BS 7671:2018.
   - Requirements under the Electricity Acts.
   - The Clean Air Act.
   - Control of Pollution Act.
   - Energy Conservation Act.
   - Regulations under The Factories Act.
   - The Building Regulations.
   - The Gas Safety Requirments.
   - Corgi publications.
   - Requirments of local electricity, gas & water undertakings & Fire Fighting Authorities.
   - The CIBSE Guide to Current Practice.
   - The IOP Plumbing Services Design Guide.
4. All plant & equipment shall be approved by the Engineer/Architect prior to installation.
5. Read this drawing in conjunction with the specifications and other employer's requirements documents.
6. All contractor installation shall be in accordance with British Standards and British European (EN) Standards & Building Regulations.
7. Contractor shall be responsible for monitoring and reporting the compliance of installations with all relevant national and local standards, codes of practice and regulations, including identifying any non-compliances.
8. Refer to architect package for fire compartmentation.
9. For detailed requirements for firestopping formed around meph services, including material specifications, approval of installers, materials and installation, identification and drawings, refer to the architect package.
10. Building outline derived from architects drawing.

HAZARD NOTES:

Refer to designer hazard identification schedule.

Falls through openings
Riser openings between levels will necessarily be open for installation. Risk of falls and falling objects. Contractor to cover over openings when not in use.

Work at height
Installation work involves work at height.

Riser access
Risks associated with difficult access. Architectural design and planning to provide risers of sufficient width and good frontal access. Including edges and at high level. To avoid over-reaching into risers. Especially at high level and in corners ideally provide full-height doors.

Think safety
Is there safe, adequate and correct means of access? Adequate lighting? Is the task safe in today's environment and weather conditions? Correct PPE and correct tools? Work area free from conflicting activities? Could your task affect the safety of anyone else?

PJR
BUILDING SERVICES DESIGN ENGINEERS
Suite 29 Level 6
New England House
New England Street
Brighton
BN1 4GH
Tel: 01273 626247
Email: mail@pjrservices.co.uk

Client:	WE BUILD
Project:	ST MARKS COURT HORSHAM WEST SUSSEX
Title:	RAINWATER RECOVERY SYSTEM & DETAILS
Drawn:	MN
Checked:	JF
Date:	FEBRUARY 2025
Scale:	NTS & 1:200 @ A1
Drawing Number:	W19/03/101
Rev:	

Amendments:

Notes:
1. Under no circumstances should scaled dimensions be used for setting out.
2. All dimensions to be checked on site.
3. This drawing to be read in conjunction with architects drawings.
4. This drawing is copyright and shall not be reproduced without permission.