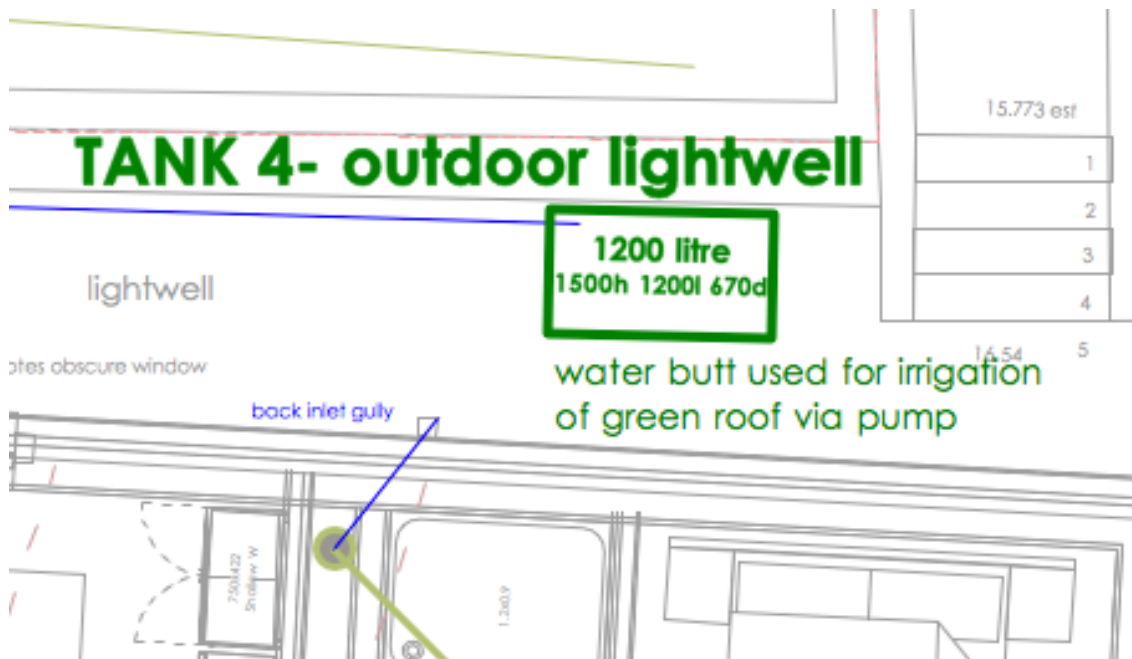


The site as an inner-city area has limited outdoor space. There is no ability to provide expansive SuD's like ponds and swales. The site is located above a tube line and has a clay substrate. As such soakaway solutions via below ground crates are not feasible, they would lead to issues with local neighbourhood contamination and substrate heave. Likewise the limited external areas cannot be brought forward with permeable paving as this again may lead to similar issues. We have attached an illustration of the external areas on the site (Appendix 1).

A blue roof solution as initially proposed would create loading issues with the building as mentioned in the technical note. The blue roof is simply attenuation tanks on the roof and holds water to be discharged at a restricted rate into the network. An attenuation tank is a long-term solution to reduce flooding caused by water runoff after long periods of rain. Due to the site location there is not scope to have below ground chambers. The current proposals are for the attenuation tanks to be located in the basement area. They will be gravity fed and will be controlled individually and then flow, via gravity, at a restricted rate into the drainage network so apart from the location of the tanks the strategy remains the same.

Rainwater can be harvested and re-used as grey water for landscaping for example to water the green roof. Tank 4 is a water butt that offers this facility.



Drawing 250 Extract showing Tank 4 location

At planning stage we showed there is not a feasible viable option for rainwater harvesting. As there is limited external landscaping there is limited scope to offer more water butts for external grey water re-use. (Appendix 2)

The remaining tanks are used to attenuate excess rainfall in the tank, releasing slowly back into the water system.

All tanks will be:

- Weatherproof (IP67) and anti-corrosive
- A WRAS approved control valve that demonstrates full compliance with requirements of The Water Supply (Water Fittings) Regulations 1999

The tanks will be fitted with:

- Filters to all rainwater intakes to prevent debris
- Inlet calmer to ensure tank debris sediment is not disturbed
- Non-return valves on all rwp intakes
- Flowbrake flow control device, limiting discharge to be built into the tank outlets prior to main drain connection.
- All outlets will be fitted with non-return valves.
- Each tank will have a active attenuation level sensor
- These sensor will be linked to a failsafe alarm controller panel located in the reception /front desk which has 24 hour cover.
- Step can then be taken to use a bypass valve with an overflow outlet for emergency drainage

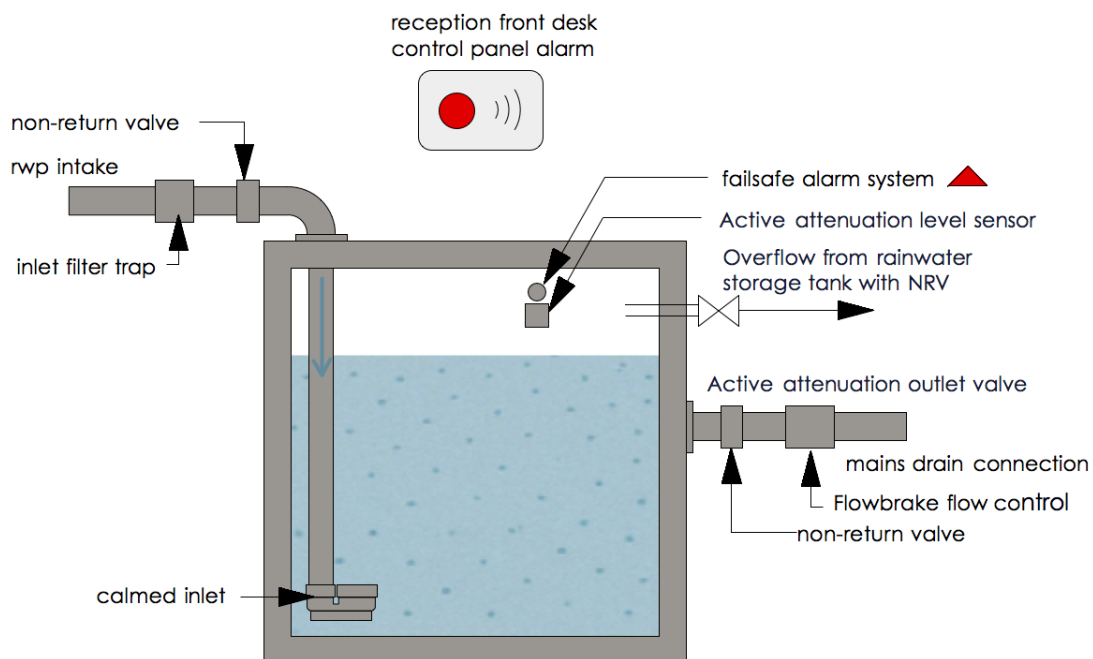


Illustration of tank setup

Each tank will be installed in a location where the room will be tanked with bund walls at access doors and demountable flood protection. Sump pumps with battery backups will be installed in each room.

Fail Safe System Battery backup:

Both the valve and site controller have a built in rechargeable battery pack to allow the system to continue working in the event of power failure. The system sends automated warning messages in the event that there is a partially or fully blocked.

Default Storm Attenuation System:

Within all failure scenarios the system defaults back to a Storm Attenuation system (Actuated valve open). The system is designed to first and foremost provide the required storm attenuation in all scenarios.

Tanks sizes proposed

Tank	Roof Area	Store Volume	Size provided
Tank 1	106 m ²	5.3 m ³	5300 Ltrs
Tank 2	94 m ²	3.8 m ³	3900 Ltrs
Tank 3	116 m ²	6.1 m ³	6000 Ltrs
Tank 4	40 m ²	1.2 m ³	1200 Ltrs

All tank sizes have been assessed through roof area calculations and volume requirements. Whilst we had some tanks oversized previously we have reviewed the available sizes and made adjustments. Whilst say tank 2 is oversized by 100 Litres Tank 3 is undersized by 100 Litres, as we have remodeled the potential roof areas to run one of the downpipes to the other tank accordingly. Likewise Tank 4 has been amended to provide the correct volume.

Maintenance

Copy of maintenance included in the original Flood Risk Assessment & Drainage Strategy pg.105 attached. Green roof maintenance attached. Water butts generally don't require any maintenance, other than occasional clearance of any debris at the inlet. (Appendix 3)

Contingency for tank failure

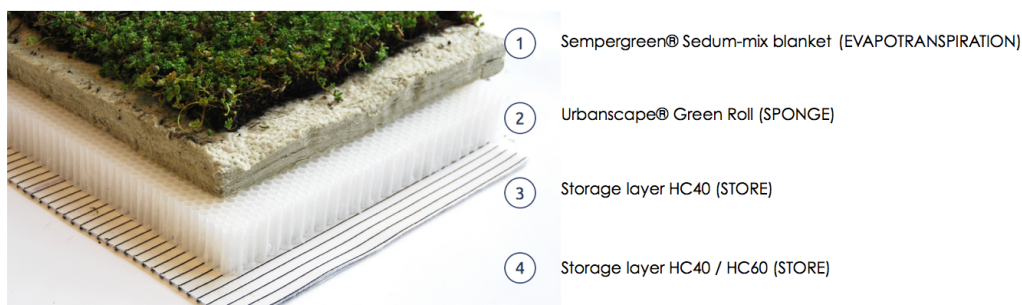
Please see copy of the 13657-Technical Note-01 extract:


" To minimise exceedance risk and subsequent flooding of the basement rooms which will hold the freestanding storm tanks, suitable precautions are provided. These including installing a non-return valve to prevent backflow, high level water alarm on each tank, high level overflow within the tanks, and a sump point within each room containing an attenuation tank for ease of water removal in an emergency. "

The additional information included above sets out the tanks failsafe system and tank room setup hopefully explain in further detail the contingency proposed.

Green Roof

In addition to the above information on the tanks we thought it would be beneficial to explain further what the green roof specification is and how this benefits the overall SuD's strategy.



 green roof approx 94.5sq.m

Sempergreen® detention green roof with integrated bio-diversity planting to provide min 60% rainwater retention with restricted run-off

Green detention roof has been designed to provide storage and outflow control by replacing the standard drain plate with needled mineral wool, a honeycomb reservoir, and a detention layer. The rainwater runoff delay can be up to 24 hours. Furthermore the held rainwater can then be slowly absorbed back into the green roof or evaporate provide a reduction in overall run-off by upto 40%

The specification for the roof is the Sempergreen Detention Roof. This system offers a lightweight solution with a low slope. The build-up of the Detention Roof, based on the Purple-Roof Concept, consists of a detention layer, a storage layer, substrate roll and a Sedum-mix blanket. By means of friction, the detention layer ensures that the runoff of the rainwater collected in the storage layer is delayed. The delay can be up to 24 hours. Alongside the delay the overall system does also offer a reduced run-off through evaporation and re-soaking into the green roof. The roof build up and technical information is included in Appendix 4.

Conclusion

We have updated the drawings and attached a new drawing of the basement showing the drainage and tanks and included the information on the tanking and sump pump arrangement (Appendix 5). We hope this additional information helps explain more fully the proposed strategy along with the maintenance and risk considerations.

Appendix 1: Illustration of External Spaces

Zone 1 & 4 = 52m2 pavement

**THIS IS TO CONFIRM THE SITE IS HARDSTANDING
AND THERE IS NO AREAS OF SOFT LANDSCAPING
WITH THE POSSIBILITY OF CONTAMINATION**

ZONE 2 & 3:
basement level
small lightwell with
slab hardstanding

ZONE 5:
— basement to chilton street
lightwell hardstanding

ZONE 4:
street level
pavement with
vaults below so
hardstanding

1:200 A3 **ILLUSTRATION OF EXTERNAL SPACE ON SITE**
SITE COVERING 70 CHURCHWAY & 53-55 CHALTON STREET INCLUDING 60 CHURCHWAY

Appendix 2: Rainwater Harvesting Extract

3. GREYWATER RECYCLING

3.1 Following comments made by Camden, further feasibility into Greywater Recycling has been made via a specialist provider (AQUALITY).

3.2 A review of the scheme can be found on the following page and indicates that the provision of such a system would have a payback of 12 years. This is not a great payback period, especially when based on a high occupancy level and due to the small size of the hotel, would have a limited water saving.

3.3 Further to this, the provision of Greywater Recycling would also require a Plant Room, illustrated below (and with a full drawing in the Appendices). This would require the loss of a Hotel Room and an estimated £50,000 of revenue an annum, reducing the viability of the scheme. Coupled with the high payback without this loss, it is not deemed feasible to incorporate Greywater Recycling into this scheme.

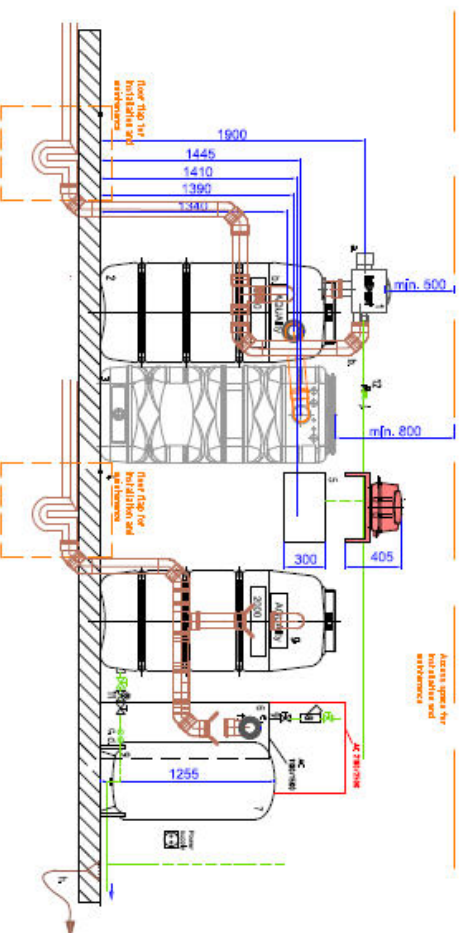


Figure 1: Illustration of Greywater Recycling System

From: Lutz Johnen <ljohnen@aquia-ility.co.uk>

Subject: RE: Chalton St, NW1. Greywater recycling and rainwater harvesting

Date: 31 July 2019 14:56:12 BST

To: Divine Ideas <divineideas@me.com>

Cc: Design Team <designteam@aquia-ility.co.uk>, Christopher James <Christopher.James@aquia-ility.co.uk>, AQUALITY Sales Team <salesteam@aquia-ility.co.uk>

Hi Steven,

As the council is asking for the calculation, we need to keep it realistic.

I calculated this as follows:

Occupancy:

46 rooms x 1.5 people per room x 90% occupancy = ~62 people

WC Demand:

62 x 25l/p/d WC use (6/4l flush avg. 5l x 5uses/d) = 1550l/d x 365 = ~565m³

GW yield:

62 x 45l (9l/min shower x 5min) = 2,790l/d x 365 = ~1,018m³

We recommend system size: 2,000l/d (ARC 80 B)

This will cover 100% of WC demand.

Budget price: £12,000 ex VAT
Excluding distribution pump

At £2.15/m³, you would look into a pay-back of roughly 12-15years.

I hope this helps.

Kind regards

Lutz

AQUALITY Trading & Consulting Ltd.

Appendix 3: Maintenance Proposals

Operation and Maintenance Requirements for Attenuation Storage Tanks

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove If necessary	Every 5 years or as required

Ref. Table 21.3, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Operation and Maintenance Requirements for Green Roofs

Maintenance Schedule	Required Action	Typical Frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (i.e. year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as requirement (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planning (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material and sources of erosion damage should be identified and controlled	As required
	If drainage inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Ref. Table 12.5, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :

Appendix 4: Green Detention Roof Specification



SYSTEM BUILD-UP DETENTION ROOF 0° - 5°

Type of Detention Roof	System build-up thickness	Saturated weight	Water buffering capacity	Water storage capacity
Detention Roof with HC40	115 mm	115 kg/m ²	33 l/m ²	59 l/m ²
Detention Roof with HC60	135 mm	134 kg/m ²	33 l/m ²	76 l/m ²

1. SEMPERGREEN SEDUM-MIX BLANKET 30MM

Pre-cultivated Sedum-mix blanket, consisting of a mix of 6 to 8 different types of Sedum. Sempergreen vegetation blankets always have at least 95% coverage upon delivery.

2. SUBSTRATE ROLL 40MM

Lightweight green roof substrate, made of long mineral wool fibres, which ensures excellent water absorption and retention. Thanks to its unique capillary effect, rainwater first spreads horizontally.

3. STORAGE LAYER HC40 or HC60 40-60MM*

Consisting of small diameter, solid-wall tubes, vertically oriented, fused as a panel. This storage layer serves as a temporary water column during heavy rainfall. The storage layer is covered with filter fleece at the top and bottom sides.

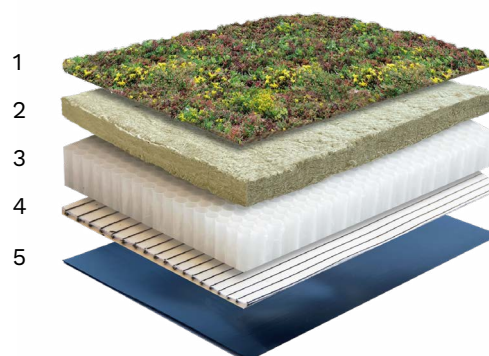
**For specifications, see the table above.*

4. DETENTION LAYER T5 5MM

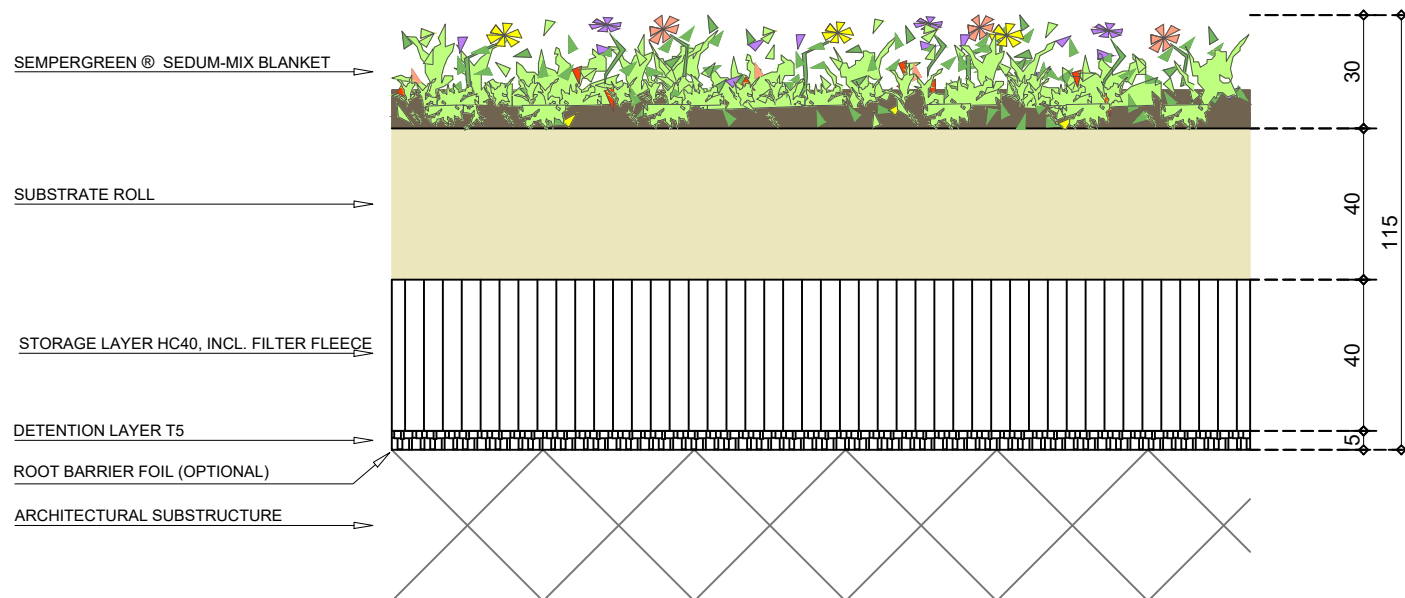
Made of sustainable recycled polyester. A three-dimensional layer in which thousands of threads are machine-stitched side by side. The stitches create friction, pushing the water column upwards to the overlying storage layer.

5. ROOT BARRIER FOIL

Optional; only applicable to roofs without root-resistant roofing material.



**WATER-DETAINING
GREEN ROOF SOLUTION
FOR ROOFS WITH A SLOPE**



Roofing:	EPDM / bitumen / PVC
Pitch:	0-5°
Build-up thickness:	115 mm
Saturated weight:	115 kg/m ²
Retention Capacity:	33 l/m ²
Detention Capacity:	59 l/m ²
Maintenance frequency:	at least twice a year

sempergreen®

SEMPERGREEN BV
DEFENSIEWEG 1
NL- 3984 LR ODIJK
+31 (0)343 539699
sales@sempergreen.com
www.sempergreen.com

Name:

Detention Roof HC40, 0-5°

Date:

03-10-2024

Drawing Number:

REV.

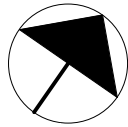
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zone 2-18

Appendix 5: SuD's drawings



Notes:

GENERAL NOTES

Do not scale from this drawing.
All dimensions to be checked on site by the contractor.

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This drawing has been prepared solely for the purpose of obtaining either Planning Consent and/ or Building Regulations Application. Unless marked as such the drawing may not be suitable for Construction Purposes.

No liability will be accepted for any omission or inconsistency should this drawing be used for construction.

This drawing and architectural work is protected under copyright law.

CLARIFICATION NOTE

Phase one works consist of 'shell and core' only. Allowances should be made to split the requirements between the phases.

Example, but not limited to:-

- All internal doors form part of phase 2 works and structural openings are to be formed as part of phase 1 works only.
- All internal plastering and finishing to form part of phase 2 work.
- All external windows & doors to form part of phase 1 works.
- Below ground drainage and RWP drops are part of phase 1. SuDs tanks form part of phase 1.
- SVP to be phase 2 but allowance for ducts runs and opening in floors to form part of phase 1.
- Green roof as part of phase 2.
- External street trees & highway works works part of phase 2

Clarification must be sought with contract documents and employers agent

GREEN ROOF INFORMATION



green roof approx 94.5sq.m

Sempergreen® detention green roof with intergated bio-diversity planting to provide min 60% rainwater retention with restricted run-off

Green detention roof has been designed to provide storage and outflow control by replacing the standard drain plate with needed mineral wool, a honeycomb reservoir, and a detention layer. The rainwater runoff delay can be up to 24 hours. Furthermore the held rainwater can then be slowing absorbed back into the green roof or evaporate provide a reduction in overall run-off by upto 40%

TANK 4- outdoor lightwell

1200 litre
500h 1200l 670d

TANK 1 - basement store

TANK 2- basement store

SUDS	type	roof area sq.m	required storage sq.m	storage ltrs	size m (WxDxH)
Tank 1	ECO5300	106	5.3	5300	1.63H X 2.2D
Tank 2	ECO3900BLK	94	3.8	3900	2.16H X 1.6D
Tank 3	ECO6250	116	6.1	6250	1.88H X 2.2D
Tank 4	ECO1200PIL	40	1.2	1200	1.5Hx1.2Lx.67D
Total		356	16.4	16650	

TANK 1 - basement store

TANK 2- basement store

TANK 3- basement store

TANK 4- outdoor lightwell



ECO5300
Cylindrical
water tank
2200mm
1630mm
-
1" / 2" BSP
500mm hinged
120kg
5300 litres / 1165 gal



ECO3900BLK
Cylindrical
water tank
1600mm
2160mm
1" / 2" BSP
500mm hinged
85kg



ECO6250
Cylindrical
water tank
2200mm
1880mm
1" / 2" BSP
500mm hinged
135kg
6250 litres / 1374 gal
ECO6250POT
14" non-vented



ECO1200PIL
Pillar
water tank
-
1500mm
1200mm
670mm
1 x 3/4" & 2 x 2" BSP
14" vented
60kg
1200 litres / 264 gal
ECO1200PILPOT
14" non-vented

FRONT VALUTS

TANK 3-
basement store

STATUS: DESIGN INTENT

DO NOT SCALE OFF THIS DRAWING



Project: 53-55 Chalton Street NW1 1HY,
60 Churchway NW1 1LT &
70 Churchway NW1 1LT

Client: Rangepay Ltd

Address: Hotel Site
53-55 Chalton Street NW1 1HY

Drawing Title:
Proposed SuDS Strategy

Date: 08/03/21 Scale: 1:50 @A1

Drawn By: GH Checked By: GH

Project No. 1103 Dwg No. 249 Rev. E

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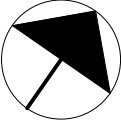
CHARLTON STREET

Rev: E- Tank revisions

Date: 13/05/2025

Rev: D- Tank revisions
Rev: C- Tank revisions
Rev: B- Tank revisions
Rev: A- Tank revisions

Date: 24/01/2025
Date: 20/12/2024
Date: 04/11/2024
Date: 17/11/2021



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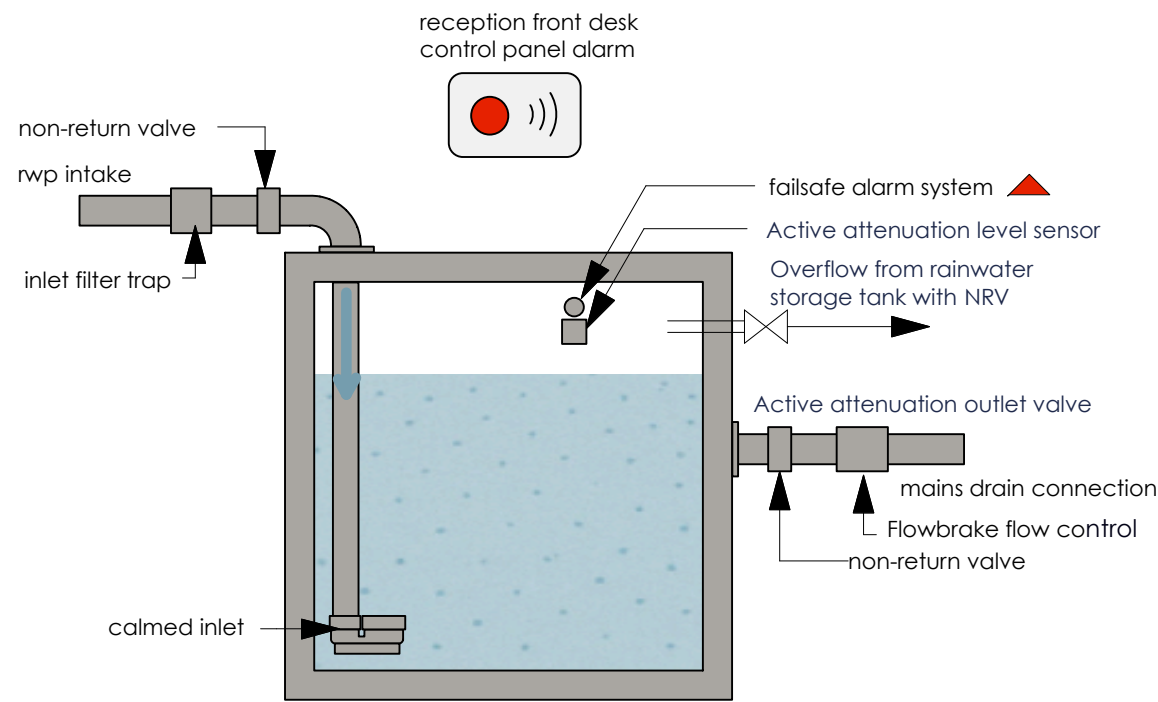
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SUD'S ATTENUATION STORAGE TANK INFORMATION



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- Filters to all rainwater intakes to prevent debris
- Inlet calmer to ensure tank debris sediment is not disturbed
- Non-return valves on all rwp intakes
- Flowbrake flow control device, limiting discharge to be built into the tank outlets prior to main drain reconnection.
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Total		356	16.4	16650	

TANK 1 - basement store

TANK 2- basement store

TANK 3- basement store

TANK 4- outdoor lightwell



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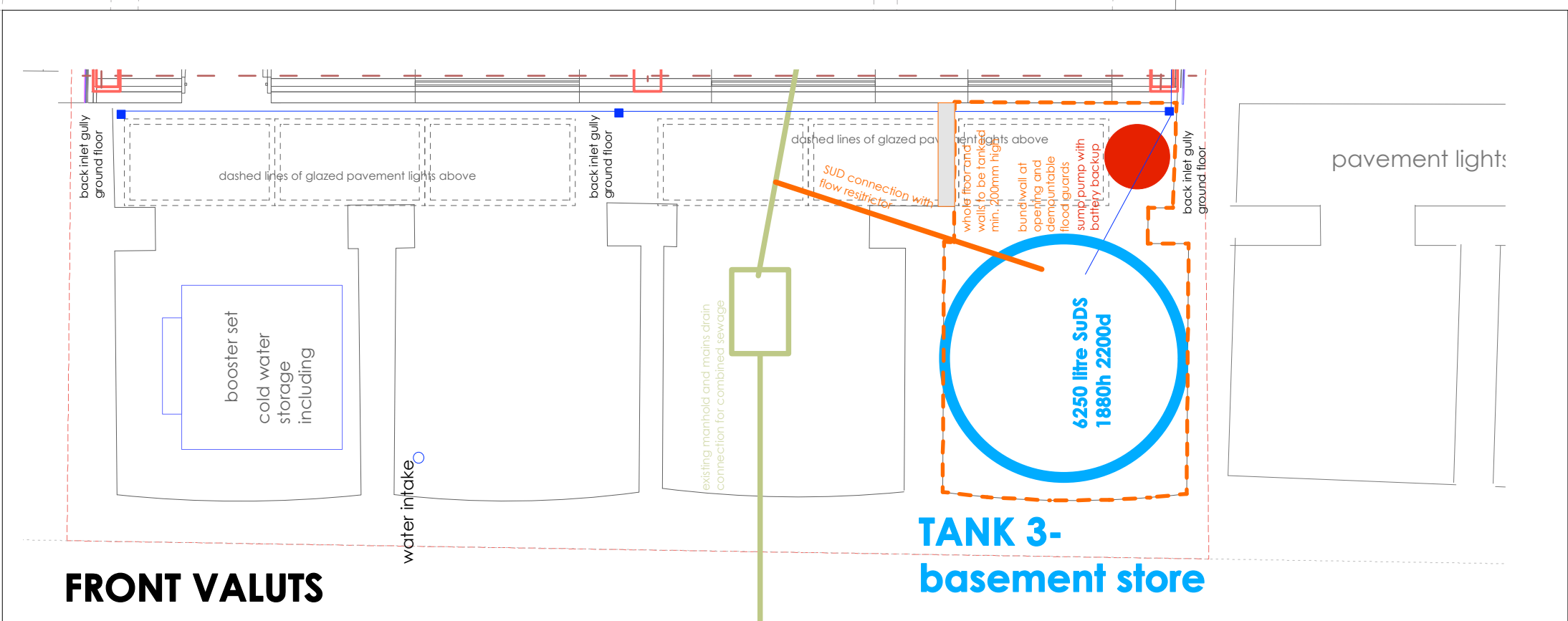
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14" non-vented



Rev:

Date:

STATUS: DESIGN INTENT

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Drawing Title:

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Date:

08/03/21

Scale:

1:50 @A1

Drawn By:

GH

Checked By:

GH

Project No.

1103

Dwg No.

250

Rev. ..

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