2429 - North Crescent (Minerva House and The Telephone Exchange),
Flood Risk Assessment & SuDS Strategy Report

Contents

Appendices

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1. Introduction

This Flood Risk Assessment (FRA) and SuDS Strategy Report has been prepared by Heyne Tillett Steel to support the planning and listed building application submitted to the London Borough of Camden (LBC) in relation to the development taking place at the Telephone Exchange and Minerva House, on North Crescent off Chenies Street.

The report aims to incorporate and demonstrate compliance with the following national, regional and local planning policy guidance and statutory requirement as far as reasonably possible.

+ National Planning Policy Framework (2019)
+ London Plan (2021)
+ Camden Strategic Flood Risk Assessment (2014)
+ Camden Local Plan (2017)
+ Camden Planning Guidance, Water and Flooding (2019)

Surface Water Management Plan (2011)

2. Site Description

2.1 Site Location

The site is located in Bloomsbury in the LBC. It is bounded to the south by North Crescent and to the north by Alfred Mews. To the east is Fitzroy House and to the west office buildings, with Tottenham Court Road beyond. It is located approximately 50m west of Goodge Street underground station.

The total site area is 0.185 hectares. It is located at the National Grid reference of 529578E, 181869N and the full site address is the Telephone Exchange (TE) and Minerva House (MH), North Crescent off Chenies Street, Bloomsbury, WC1E 7PH.

The site location and individual buildings can be seen in Image 1.

2.2 Existing Development

The site comprises two office buildings facing North Crescent, originally built in 1912. Including the lower ground, ground floor and three above-ground levels, the two buildings have an overall gross internal area of c.5,513m^2. Minerva House (the more westerly of the two buildings) is a Grade II listed building designed by George Vernon. Although Telephone Exchange is not listed, it is highlighted as a building of significance to the Bloomsbury Conservation Area.

2.3 Proposed Development

The proposed developments consists of refurbishment and reconfiguration of the existing buildings; including a one-storey extension, plus plant, minor demolition works associated with internal and external alterations to provide additional office accommodation and associated works.

For the architectural proposals please refer to the planning drawings submitted with the application

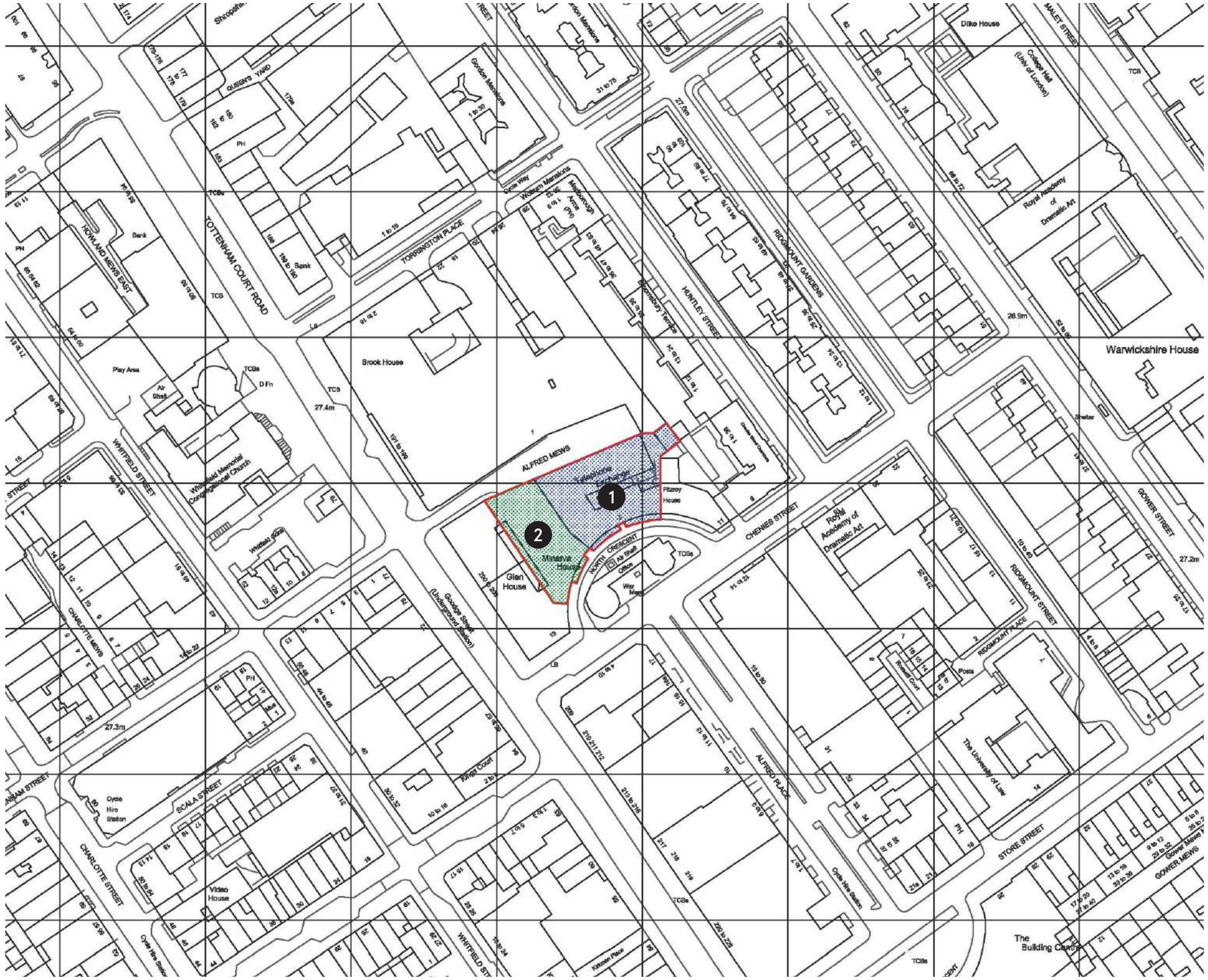


Image 1 - Site Location Plan

1. Telephone Exchange
2. Minerva House

3. .Flood Risk

In order to determine the risk of flooding for the development site, the Environment Agency (EA)'s website was referenced as well as LBC flood maps, including information contained in the Strategic Flood Risk Assessment (SFRA) and Surface Water Management Plan (SWMP).

3.1 Flood Risk from Rivers and/or the Sea

As shown in Image 2, the site lies in Flood Zone 1 which confirms that it is at low risk of flooding from rivers and the sea. Flood Zone 1 is defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). Therefore, flood risk from rivers or sea is considered low.

As the site lies in the Flood Zone 1, all development is appropriate and therefore the sequential and exception tests are not required.

Image 2 - Flood Risk from Rivers and the Sea (extract from EA website)

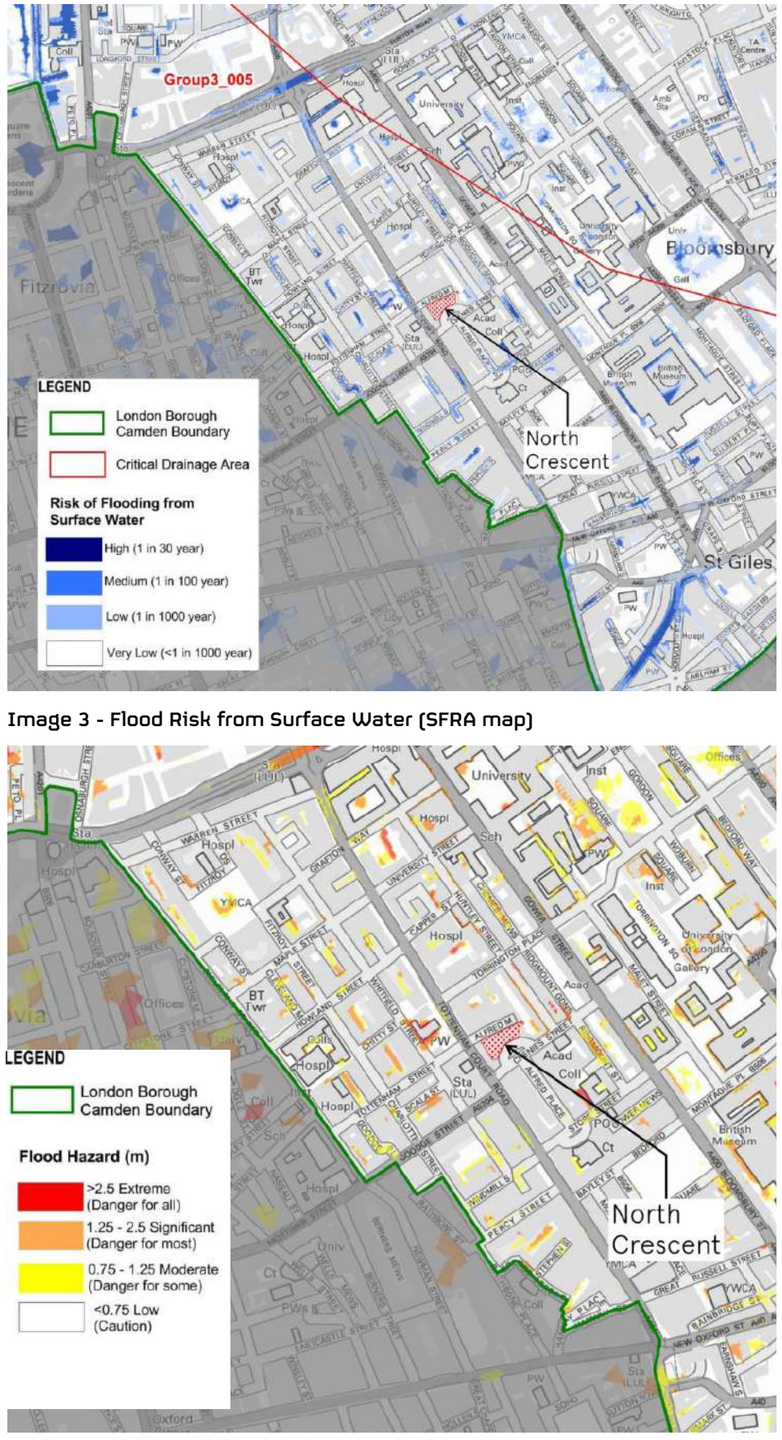


Image 3 - Flood Risk from Surface Water (SFRA map)

3.2 Flood Risk from Surface Water and Overland Flows

Surface water flooding occurs when rainwater neither drains away through the in-situ drainage system nor soaks into the ground. Instead, it ponds locally or flows over the ground. Surface water flooding is typically associated with topographical low points.

The SFRA 'Updated Flood Maps for Surface Water Flooding' (Image 3) shows that the site is located in a critical drainage area (CDA); however, both this map and the EA flood maps (Image 4) confirm that the site is at very low risk of surface water flooding. Furthermore, the SFRA 'Hazard: 1 in 1000-year flood event' map shows that the site has a low flood hazard rating (Image 5).

Therefore, the surface water flood risk to the proposed development is considered low.

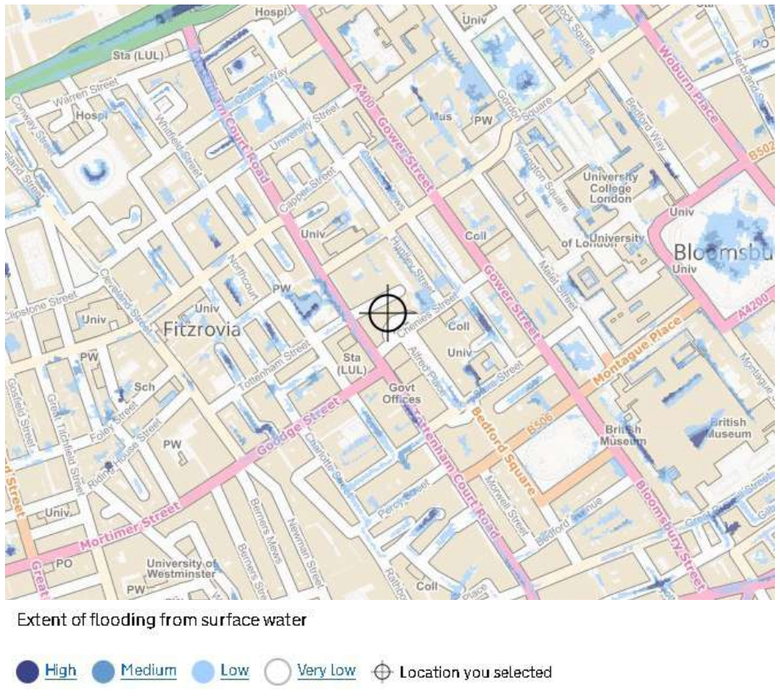


Image 4 - Flood Risk from Surface Water (extract from EA website)

Image 5 - Hazard - 1 in 1000 year flood event

3.3 Flood Risk from Sewers

The SFRA contains maps for both internal and external sewer flooding. This is based on a water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years

These show that the site is not within an area with historical flooding events (Image 6 and Image 7).

The basement under the existing buildings will be lowered in some areas. Drainage from these areas will be pumped to the above-ground drainage and then to the existing gravity outfall to the public sewers, as will the drainage for the existing retained areas. Drainage from above ground level will be routed towards to the existing outfalls under gravity, to reduce the reliance on pumped discharge.

The most likely reason for sewer flooding onsite is due to capacity issues during heavy rainfalls within the public sewerage network. The development proposes to reduce surface water runoff rates, as indicated in Section 5.1, and thus will contribute towards reducing the risk of flooding from sewer within the neighbouring area.

Therefore, the flood risk from sewers is considered low.

Image 6 - Internal Sewer Flooding (SFRA)

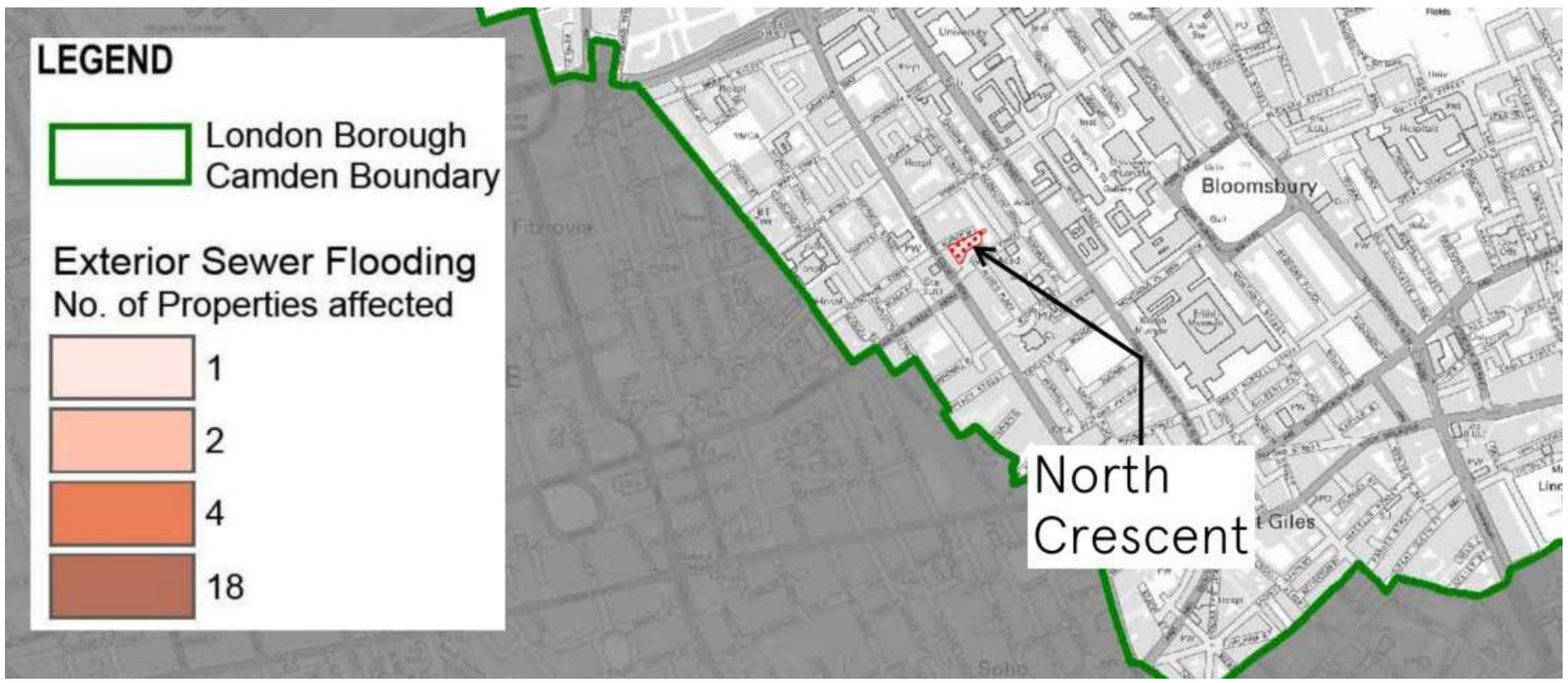


Image 7 - External Sewer Flooding (SFRA)

3.4 Flood Risk from Artificial Sources

The Environment Agency flood maps were reviewed to assess the risk of flooding from reservoirs. The maps indicate that the site is not at risk from flooding from reservoirs (Image 8).

There are no watercourses recorded close to the site. The nearest is the historical course of the River Fleet (Image 9) which approximately 700m to the east of the site. The River Fleet is culverted and now serves as a combined sewer that discharges to the River Thames at Blackfriars Bridge.

The flood risk from artificial sources is therefore considered to be low.

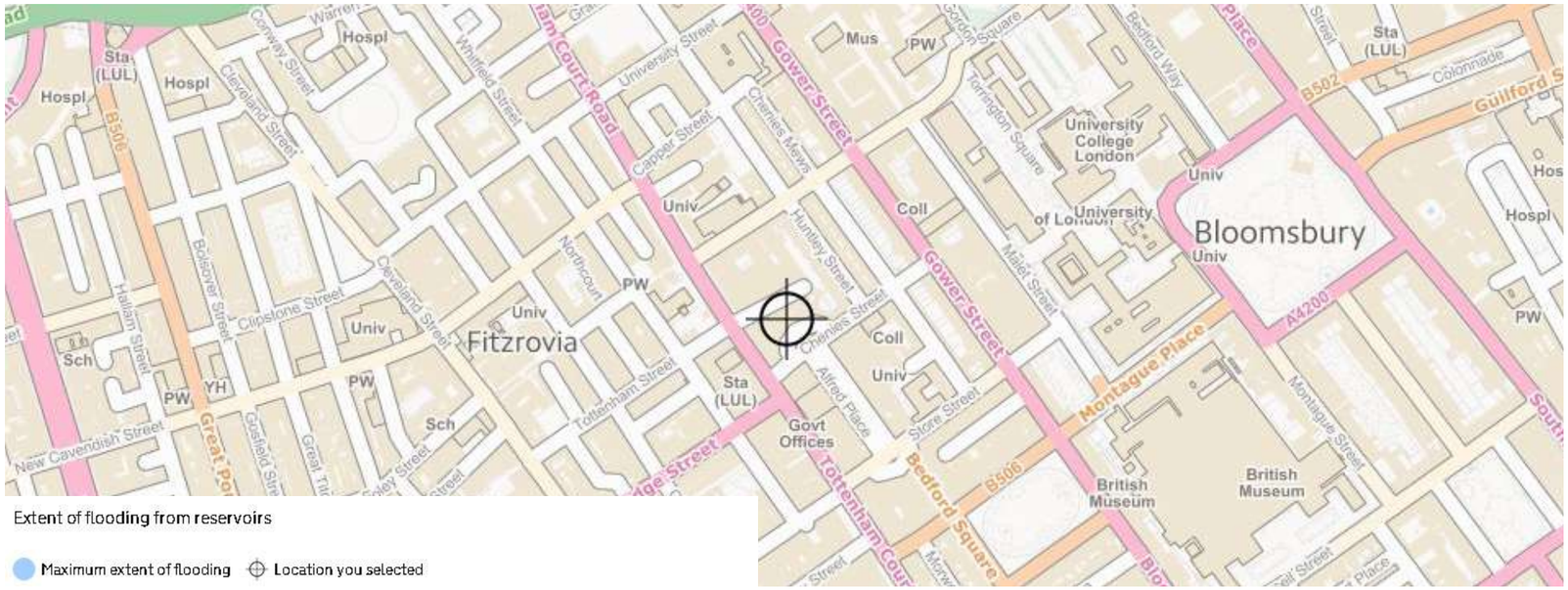


Image 8 - Risk of Flooding from Reservoirs

Image 9 - Surface Waterbodies

3.5 Flood Risk from Groundwater

The SFRA contains a map showing historical records of groundwater flooding and areas of increased potential for elevated groundwater (Image 10). This shows that the site is not in or near an area of permeable superficial deposits, or of groundwater flooding incidents.

Waterproofing of the proposed basement structure is proposed in line with BS 8102. Therefore, the resulting risk of flooding from groundwater is considered to be low.

3.6 Summary

A thorough review of flood data published by the EA and LBC London was undertaken. This exercise confirmed that the proposed development is at low risk of flooding from all sources.

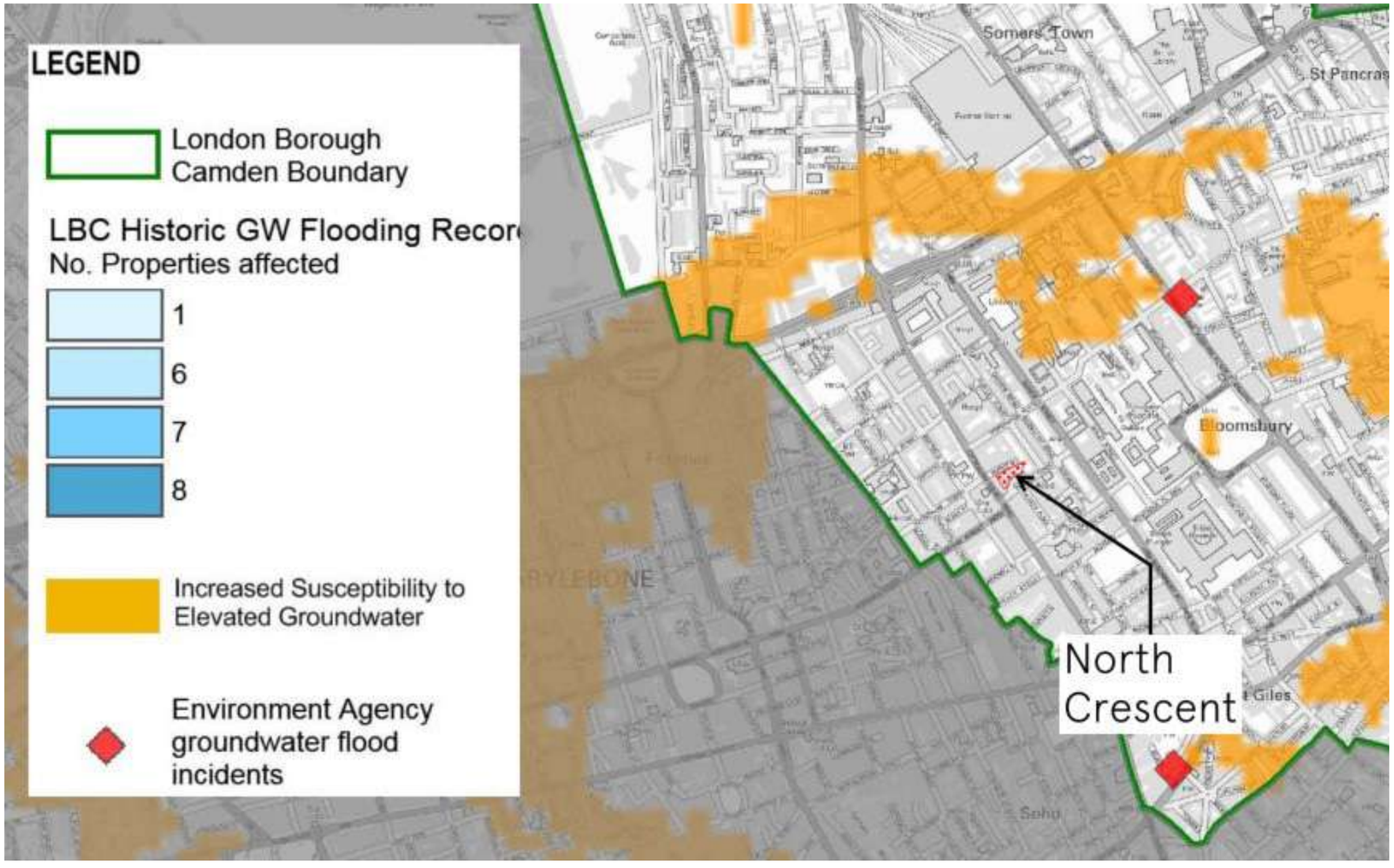


Image 10 - Groundwater flood risk

4. Existing Drainage Arrangements

4.1 Public Drainage Network

There are Thames Water combined public sewers beneath North Crescent to the south and Alfred Mews to the north. A 940mm x 635mm sewer falls east along North Crescent from Thames Water manholes 5803 and 6811, approximately 4.3m below ground level. There is a 1143mm x 737mm sewer that begins beneath Alfred Mews at a depth of approximately 4.5m below ground level, that falls west towards Tottenham Court Road.

A CCTV drainage survey will be undertaken at the site to confirm the existing sewer outfalls.

A copy of the sewer records is contained in Appendix A and an extract from it is shown below in Image 11.

4.2 Private Drainage Network

The site is served by existing rainwater pipes and gullies that discharge the surface water runoff to the combined sewers under North Crescent and Alfred Mews, to the rear of the building.

There is no evidence or record of any attenuation on site, and it is assumed that the site discharges unattenuated. A site outflow rate of 109l/s is calculated for the 1:100-year rainfall event, with a 40% climate change allowance.

The drainage at basement level is pumped to high-level before discharging under gravity to the sewers, and the remaining drainage, from ground-floor level and above, discharges under gravity.

A CCTV drainage survey will be undertaken at the site to confirm the arrangement and condition of the existing below-ground drainage.

4.3 Existing Surface Water Rates

The site has an area of approximately 0.185 ha (1,850m^2) and is completely impermeable in the existing situation. The existing peak run-off has been calculated using the Modified Rational Method in accordance with the following formula:

Q = 3.61 Cv x i x A

Where Cv is the volumetric runoff coefficient, A is the catchment area in hectares and i is the peak rainfall intensity in mm/hr which was obtained using FEH data and MicroDrainage software. The existing runoff calculations are included in Appendix B.

Table 1 summarises the existing (unattenuated) peak run-off rate for the 1:2-year, 1:30-year and 1:100-year rainfall events, as well as the 1:100-year event with 40% CC (climate change allowance).

Table 1: Existing Surface Water Run-off Rates

Return period	Existing flowrate
1:2*-year	18.4l/s
1:30-year	56.4l/s
1:100-year	74.9l/s
1:100-year + 40% CC	104.9 l/s

*FEH data cannot be used to generate a 1 in 1 year rainfall event

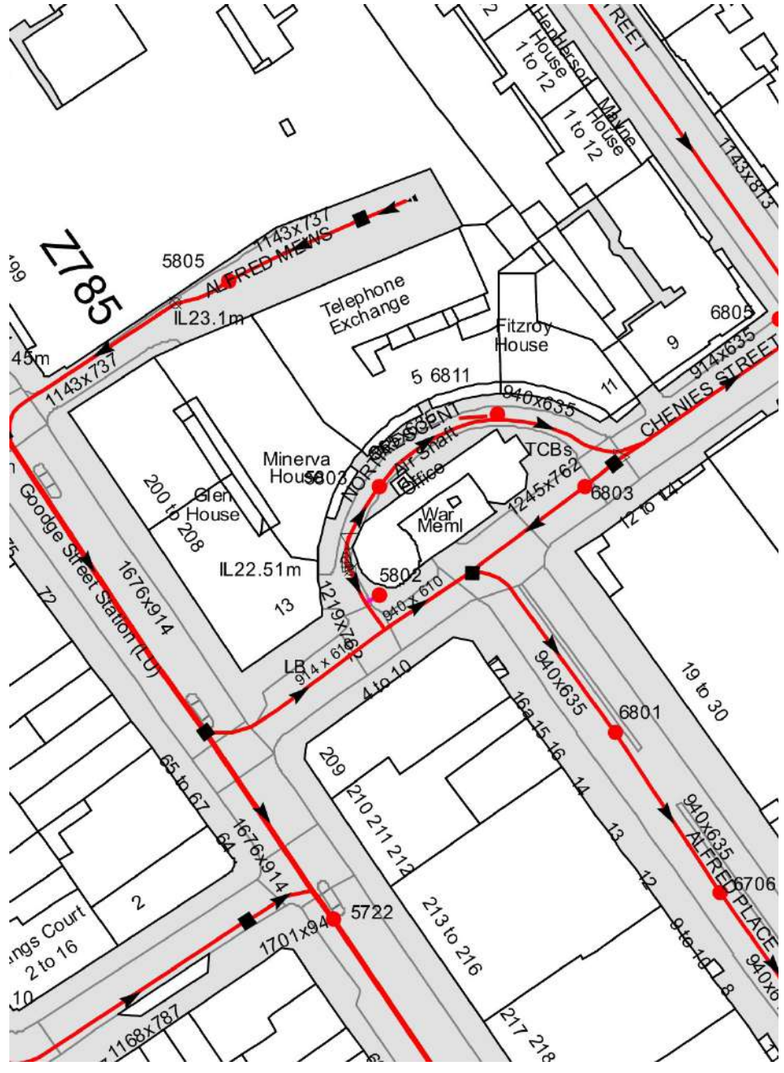


Image 11 - Thames Water Sewer Records

5. Proposed Drainage Arrangements

It is intended to re-use the existing combined outfalls to the public sewer for proposed foul and surface water drainage. Where possible, existing drainage systems will be re-used, and where new systems are required separated foul and surface water networks will be provided to serve the building, which will be designed in accordance with Building Regulations Part H.

A pre-application note was sent to LBC for comment, and is included in Appendix C. No response has been received to date.

5.1 Surface Water Drainage Proposals

Rainwater harvesting is proposed, using the capacity of the blue roof on the fourth-floor terrace with a diverting valve to ensure storage is available during heavy rainfall events. Opportunities for infiltration are limited due to the urban location of the site and lack of suitable external space.

It is proposed to include blue roofs wherever possible on the flat roof and on the terraces, with the outflow rate from these controlled as low as possible.

The site will continue to discharge to the combined sewer as both watercourses and surface water sewers are not present near the site.

The London Plan and LBC policy require that surface water is managed in line with the sustainability hierarchy set out in Table 2. The surface water drainage network has been designed in coordination with the architect and aims to incorporate SuDS into the fabric of the building.

The Camden SuDS Proforma has also been completed and acts as a summary for the evidence set out in this report. Refer to Appendix D for a copy of the proforma.

Priority was given to SuDS which provide multi-functional benefits and extensive coordination was undertaken to ensure that SuDS are incorporated into the building fabric. Table 2 presents the drainage hierarchy, taken from Policy SI13 of the London Plan, which shows which SuDS are proposed to be incorporated into the development.

Table 2: Surface Water Drainage Hierarchy (Policy SI13 London Plan)

SuDS Technique	Included	Examples	
1	Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)	✓	Blue-green roofs are proposed at roof level across a large part of the building as well as use of one of the blue roofs for rainwater harvesting.
2	Rainwater infiltration to ground at or close to source	✗	There is minimal external area and due to the density of buildings there is no space for infiltration features It is therefore concluded that infiltration is not viable on the site.
3	Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)	✓	A number of green roofs are proposed, which will have extensive build-ups which will also provide a level of rainwater attenuation.
4	Rainwater discharge direct to a watercourse (unless not appropriate)	✗	The closest watercourse is the River Thames, 1.6 km south-east of the site. The distance and location of the river from the site make discharge to the watercourse infeasible. It is therefore concluded that discharge to a watercourse is not practicable.
5	Controlled rainwater discharge to a surface water sewer or drain	✗	There are no public surface water sewers within the vicinity of the site.
6	Controlled rainwater discharge to a combined sewer	✓	It is proposed to discharge surface water from SuDS features to the combined public sewers in North Crescent and Alfred Mews via existing connections.

Greenfield run-off rates have been calculated using the calculation tool available on www.uksuds.com and are 0.22 l/s for Q_{BAR} and 0.69 l/s for the 1 in 100-year rainfall event. Based on the LBC planning policy, it is proposed to reduce the peak surface water run-off rate as far as possible.

The SuDS elements which are being used for attenuation are outlined in detail in this section.

5.1.1 Blue Roofs

A mix of blue roofs and blue green roofs are proposed at the site. Blue-green roofs are proposed on flat roofs where possible, and blue roofs are proposed on terraces and flat roofs where access is required and plant is proposed.

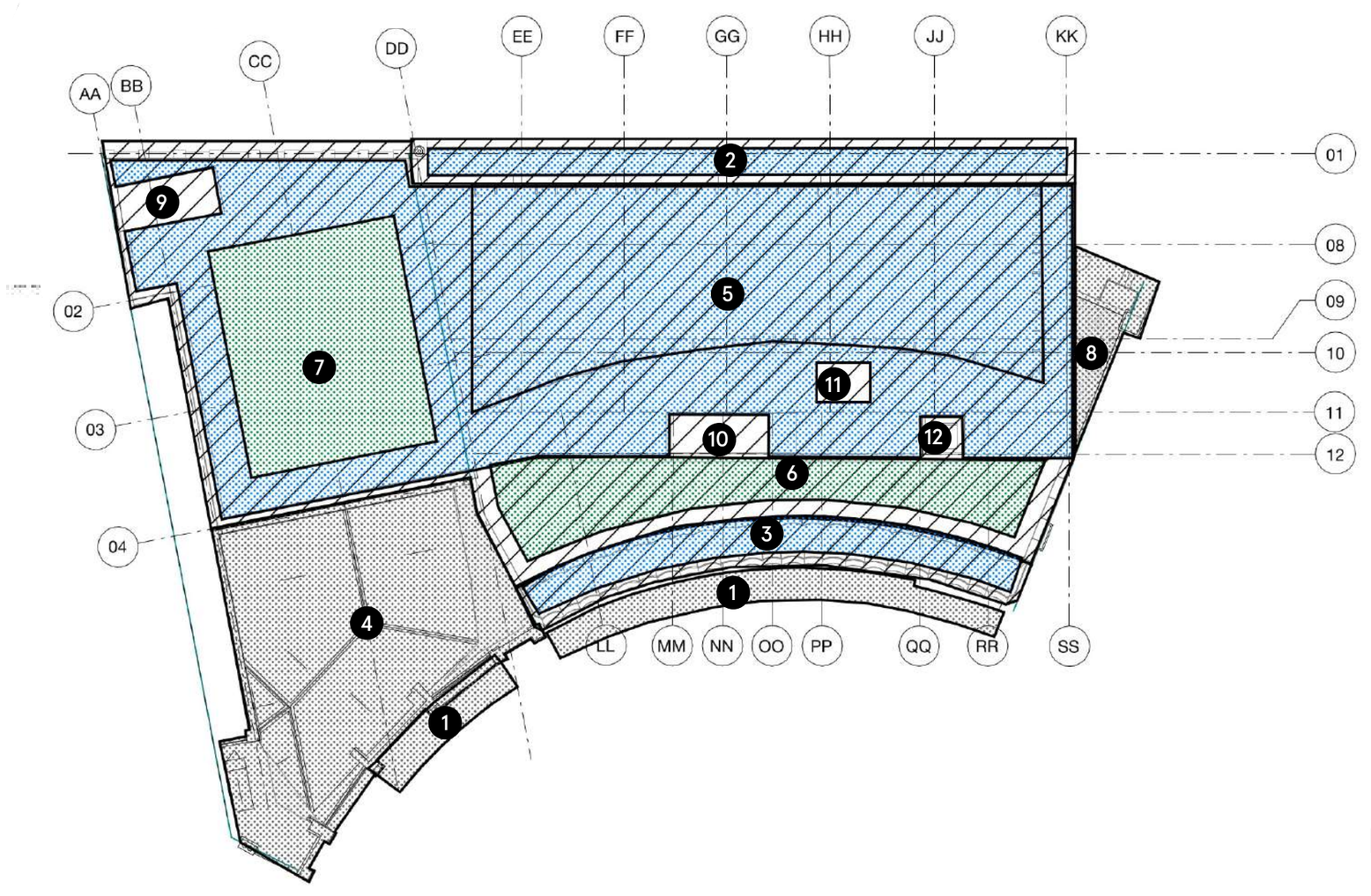
The total area of blue roofs will be approximately 1125m^2, and these will provide surface water attenuation for 1343m^2 of the 1850m^2 building area.

The proposed catchments and areas of blue roofs are shown in Image 12.

Blue roof specialists (ACO) were engaged and provided preliminary calculations based on blue roof build-ups ranging from 85 mm to 125 mm. This gives a total discharge rate from the blue roofs of 2.8l/s for the 1 in 100-year rainfall event (+40% climate change). A breakdown of depths and run-off rates is included in Table 3. The reduced run-off from the blue roofs will achieved using restricted outlets. Blue roof calculations are included within Appendix E.

Table 3: Blue and Blue-Green Roofs

Roof No.	Location (roof type)	Catchment Area	Blue Roof Area	Blue Roof Depth	Run-off Rate
2	3rd floor terrace	105m2	60m2	85mm	0.9l/s
3	4th floor terrace	88m^2	65m^2	85mm	0.4 l/s
5	Flat roof	1150m^2	1000m^2	125mm	1.5 l/s
	Total	1343 m^2	1125 m^2		**2.8 l/s**



3 MH - Pitched roof discharges unattenuated to sewer
4 MH & TE flat roof - 150mm blue roof
5 TE riser/ lift overrun - discharges to Roof 2
6 TE roof plant - discharges to roof 2
7 MH & TE roof plant - 150mm blue roof
8 5th floor terrace - 150mm deep blue roof
9 4th floor terrace - 150mm deep blue roof
10 MH, TE Basement lightwell - discharges unattenuated to sewer

KEY

Blue roof
Green-blue roof
Area discharging unattenuated to sewer
Area area discharging to blue roof

Image 12 - Proposed SuDS Strategy

5.1.2 Remaining Area

The remaining building area consists of an existing pitched roof over Minerva House, and basement-level lightwells in front of both Minerva House and the Telephone Exchange. It is proposed that these areas will discharge unattenuated, as providing attenuation within the building would require pumped tanks. This is not recommended for a number of reasons. These include the following:

Sustainability: the continuous energy/electricity requirement to pump surface water is not a sustainable approach

Maintenance: additional pumps and tanks require additional maintenance and introduce a risk of failure/flooding if this maintenance is not undertaken.

Costs: apart from the introduction of additional elements themselves, the cost of additional breaking out of existing slab, unnecessary rerouting of RWPs above ground and loss of usable space within the building would compromise the financial viability of the development

Pumping of surface water is discouraged under the London Plan.

Listed building: the roof to the front of Minerva House is Grade II listed, and demolition/amendments to this area are to be minimized.

The peak flow rate for these areas in the 1:100-year storm event with 40% climate change event (CC) is 22.7l/s.

This results in a peak discharge rate for the entire site of 25.5 l/s for the 1 in 100 + 40% CC. This discharge will be to the existing outfalls into the Thames Water combined sewers.

5.1.3 Multi-Functional Benefits

In accordance with the NPPG and the London Plan, the aim of the SuDS design has been to provide multi-functional benefits with a focus on water quality, biodiversity and amenity as well as reducing the peak run-off.

The inclusion of green-blue roofs at the site will provide biodiversity benefits and passive irrigation of green roofs above blue roof build-ups.

5.1.4 Summary

A large area of the site will be served by SuDS, in line with the requirements set out in the London Plan. Surface water at the site will be attenuated using a combination of blue and blue green roofs.

The proposed attenuation will lead to a total outflow rate from the site of 25.5l/s in the 1:100-year rainfall event, with a 40% climate change allowance, which represents a 76% reduction in the existing outflow rate for the same rainfall event.

A pre-development enquiry was submitted to Thames Water to check for sewer capacity, in accordance with the Camden Local Plan. This is included within Appendix F.

A summary of the various run-off rates in question for the development site are presented in Table 4. Although greenfield runoff rates are not achievable due to the lack of scope for attenuation tanks, for the reasons stated above, the proposed SuDS interventions result in a significant reduction to the peak surface water run-off site.

5.2 Proposed Foul Water Drainage Strategy

Foul water drainage from ground floor level and above is proposed to be discharged by gravity to the existing outfall to the Thames Water sewers. The basement is proposed to continue to discharge as existing, by being pumped to high level before connecting to the above ground drainage and discharging by gravity.

A pre-development enquiry was submitted to Thames Water to check for foul sewer capacity, in accordance with the Camden Local Plan. This is included within Appendix F. The response from Thames Water indicated that there are no capacity issues anticipated from these flows.

5.3 Drainage Inspection and Maintenance Strategy

The surface water network will route the rainwater downpipes from the blue roof and remaining areas towards the outfalls via gravity.

In accordance with CIRIA C625 it is recommended that a private SuDS maintenance agreement is agreed as a simple contract between the property owner/ tenant (customer) and the maintenance provider (the maintainer). It is mainly to facilitate continuing maintenance of the SuDS that are in private ownership. The maintenance requirements are in accordance with the CIRIA C753 SuDS Manual 2015. Appendix G contains the proposed inspection and maintenance strategy.

Table 4: Comparison of Existing and Proposed Run-off rates

Return Period	Run-off Rate				Betterment
	Existing	Proposed			
		Blue/green-blue roofs	Unattenuated roof/lightwell	Total	
1:2*-year	18.4 l/s	0.7 l/s	4.0 l/s	4.7 l/s	75%
1:30-year	56.4 l/s	1.9 l/s	12.2 l/	14.1 l/s	75%
1:100-year	74.9 l/s	2.4 l/s	16.2 l/s	18.6 l/s	75%
1:100-year + 40% CC	104.9 l/s	2.8 l/s	22.7 l/s	25.5 l/s	76%

***FEH data cannot be used to generate a 1 in 1 year rainfall event**

6. Conclusion

This FRA and SuDS Strategy report has been prepared in accordance with local and national planning policy and guidance documents including the London Borough of Camden SFRA, the London Plan and the NPPF. The proposed development complies with local and national planning policy on flood risk and sustainable drainage.

This report confirmed that the development site is at low risk from all sources of flooding.

The suitability of different SuDS techniques was assessed in accordance with requirements set out in the London Plan. Surface water attenuation will be provided in the form of blue and blue green roofs. The areas that cannot be routed to blue roofs are proposed to discharge under gravity at an unattenuated rate to the sewer.

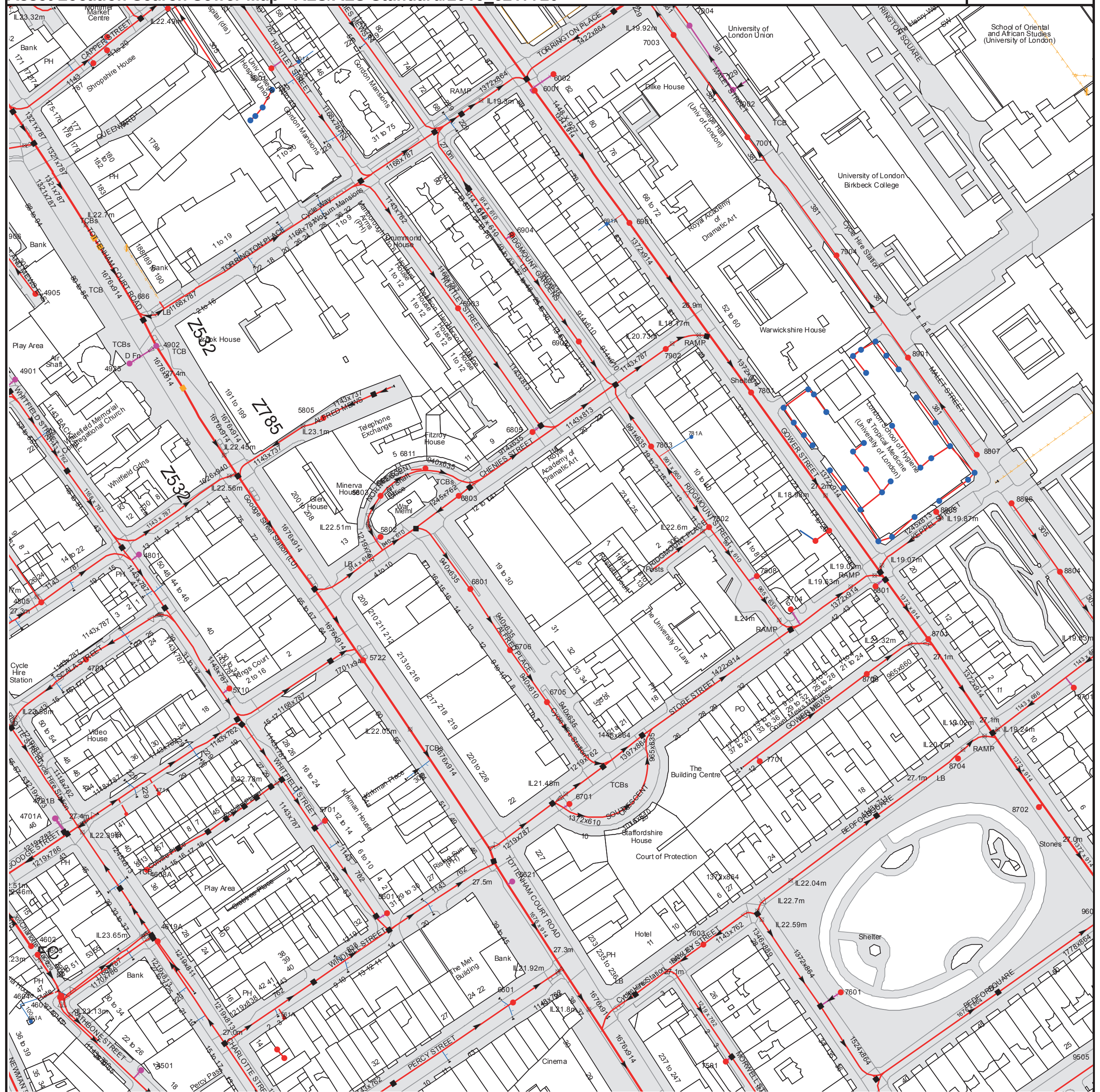
The runoff from the blue and blue-green roofs will be limited to 2.8 l/s, for a contributing area of 1,343m^2. The peak surface water run-off rate from the site will be restricted to 25.5 l/s for the 1 in 100-year storm event with 40% climate change. For the whole site, the proposed sustainable drainage measures will provide a 76% betterment on the existing surface water run-off rates. This results in a significant reduction in peak run-off rates compared to the existing situation.

The development proposals meet the requirements of national and local planning policy from a flood risk and drainage perspective.

Appendix A

Thames Water Asset Map

Asset Location Search Sewer Map - ALS/ALS Standard/2015_3217720



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 529664,181827

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
88DG	n/a	n/a
88DH	n/a	n/a
8807	26.91	21.22
88DC	n/a	n/a
88CA	n/a	n/a
78DA	n/a	n/a
88DE	n/a	n/a
78DB	n/a	n/a
88DF	n/a	n/a
78DC	n/a	n/a
88CD	n/a	n/a
78CH	n/a	n/a
78CJ	n/a	n/a
88BJ	n/a	n/a
78CI	n/a	n/a
7801	26.98	19.1
79BD	n/a	n/a
89AC	n/a	n/a
89AI	n/a	n/a
8901	26.72	20.88
89AD	n/a	n/a
89AH	n/a	n/a
89AE	n/a	n/a
89AF	n/a	n/a
7904	26.63	20.58
7001	26.52	20.32
5805	28.01	23.46
5722	27.69	22.16
5803	27.92	23.62
5802	n/a	n/a
6811	n/a	n/a
6903	26.76	21.51
6803	27.23	22.24
6801	27.47	21.81
6706	27.23	21.62
6904	26.78	n/a
6805	n/a	n/a
6001	n/a	n/a
6705	27.04	21.46
6002	n/a	n/a
6902	26.69	21.85
691A	n/a	n/a
6901	26.95	19.11
7803	26.21	21.94
7902	26.85	n/a
7003	26.34	19.96
7004	26.2	20.18
781A	n/a	n/a
7802	26.26	22.22
7002	26.47	20.45
4901	n/a	n/a
4905	26.51	25.29
4805	n/a	n/a
4704	27.22	n/a
40DJ	n/a	n/a
40DF	n/a	n/a
40DG	n/a	n/a
4925	27.31	n/a
4801	n/a	n/a
4902	27.41	22.57
471A	n/a	n/a
40EE	n/a	n/a
5710	n/a	n/a
50EJ	n/a	n/a
50FA	n/a	n/a
50FB	n/a	n/a
5001	n/a	n/a
50FC	n/a	n/a
501A	n/a	n/a
7601	n/a	n/a
8702	26.92	n/a
7701	26.15	n/a
8704	26.99	n/a
9701	n/a	n/a
8706	26.06	21.66
8701	27.07	18.97
7704	n/a	n/a
8801	27.06	n/a
7808	26.58	26.58
8804	26.88	20.12
88CI	n/a	n/a
78BA	n/a	n/a
88CH	n/a	n/a
78BC	n/a	n/a
88CG	n/a	n/a
8805	n/a	n/a
88CJ	n/a	n/a
8806	26.99	20.38
88CF	n/a	n/a
88DA	n/a	n/a
78CG	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
88DB	n/a	n/a
88CC	n/a	n/a
88CB	n/a	n/a
78CF	n/a	n/a
88DD	n/a	n/a
55BD	n/a	n/a
55BB	n/a	n/a
561A	n/a	n/a
5701	n/a	n/a
5601	n/a	n/a
6621	27.63	n/a
6601	27.24	22.15
6701	n/a	n/a
7603	27.13	22.11
7501	n/a	n/a
4501	n/a	n/a
461A	n/a	n/a
4601	26.87	23.49
4604	26.87	23.13
4603	27.13	24.23
4602	27.13	26.21
4619A	27.2	22.69
4608A	n/a	n/a
4701A	n/a	n/a
4701B	n/a	n/a
471B	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Appendix B

Existing Site Runoff Calculations

	Proposed				***Flow rate(l/s)***				
	Zone	***Catchment area (m^2)***	***Blue roof area (m^2)***	***Depth of blue roof***	*100 + 40%*	*100-year*	*30-year*	*2-year*	***Notes***
1	Basement lightwells	72	-	-	4.4	3.1	2.4	0.8	*Discharges unattenuated*
2	3rd floor terrace	105	60	85	0.9	0.8	0.7	0.3	
3	4th floor terrace	88	65	85	0.4	0.4	0.3	0.1	
4	Existing pitched roof	270	-	-	16.5	11.8	8.9	2.9	*Discharges unattenuated*
5	Flat Roof	1150	1000	125	1.5	1.2	0.9	0.3	
8	Flat roof	29	-	-	1.8	1.3	1.0	0.3	*Discharges unattenuated*
6	*Flat roof*	*-*	*114*						
7	*Flat roof*	*-*	*154*						
9	*Access stair*	*16*							*Discharges to blue roof*
10	*Lift overrun*	*15*							*Discharges to blue roof*
11	*Rooflight*	*8*							*Discharges to blue roof*
12	*Riser*	*6*							*Discharges to blue roof*
	TOTAL	**1714**	**1125**		**25.5**	**18.6**	**14.1**	**4.7**	
				Existing	104.9	74.9	56.4	18.4	
				% Betterment	76%	75%	75%	75%	
				Total blue-green	2.8	2.4	1.9	0.7	
				Total unattenuated	22.7	16.2	12.2	4.0	

Greenfield rates	l/s	***Return period***	***Storage volume req.***
Qbar	0.22		
Q1	0.18	2-year	53
Q30	0.5	30-year	98
Q100	0.69	100-year	138
3 Q100*	2.07	100-year + 40% CC	202

Unattenuated flow-rates (rational method)	
Runoff coefficient Cv	
Impermeable area	0.95
Green roof	0.3
Return period	Rainfall intensity i (mm/hr)
2-year	31.28
30-year	95.96
100-year	127.440
100-year + 40% CC	178.416
Existing areas A (m^2) Q = 3.61 x Cv x i x A	
Return period	Peak flow-rate Q (l/s)
2-year	18.4
30-year	56.4
100-year	74.9
100-year + 40% CC	104.9

Appendix C

Correspondence with London Borough of Camden

Ceridwen Salisbury

From: Ceridwen Salisbury
Sent: 11 November 2020 15:19
To: Jaspreet.Chana@camden.gov.uk
Cc: Gabriel.Berry-Khan@camden.gov.uk; Neil.McDonald@camden.gov.uk; Dylan Chatterton; Krzysztof Marcinkiewicz
Subject: RE: Chenies Street SuDS proposals (pre-app ref. 2020/3616/PRE) [Filed 26 Feb 2021 12:31]
Attachments: 20201104_SuDS_Strategy_P05.pdf

Dear Jaspreet,

HTS are the civil engineers on a scheme at Chenies Street in Camden that is currently being developed for planning. We have designed a preliminary surface water drainage scheme for the site that we would like to discuss with you prior to submission of the planning application. A very brief summary of it is given below, and I attach a sketch showing the proposed rainwater catchments and how they discharge.

In the existing situation, the site discharges to the combined sewers under North Crescent to the front, and Albert Mews to the rear of the building. There is no evidence or record of any attenuation on site, and it is assumed that the site discharges unattenuated.

For the proposed development the drainage hierarchy was followed to determine the preferred SuDS strategy. Rainwater harvesting is not proposed due to space limitations and constraints within the existing building. Opportunities for infiltration are limited due to the urban location of the site and lack of suitable external space. It is proposed to include blue roofs wherever possible on all flat roofs and on two terraces, with the outflow rate from these controlled as low as possible. The total area of blue roofs will be approximately 980m^2, and these will provide surface water attenuation for 1300m^2 of the building area. The remaining 360m^2 building area consists of an existing pitched roof over Minerva House, and basement-level lightwells in front of both Minerva House and the Telephone Exchange. It is proposed that these areas will discharge unattenuated, as providing attenuation within the building would require pumped tanks, and this is not a sustainable solution.

The site will continue to discharge to the combined sewer as both watercourses and surface water sewers are not present near the site. The proposed attenuation will lead to a total outflow rate from the site in the 1:100-year rainfall event, with a 40% climate change allowance, that represents a 63% reduction in the existing outflow rate for the same rainfall event.

Please could you let me know if this seems like a reasonable proposal, and if you have any comments/ need any more detail about the proposals.

Kind regards
Ceri

Ceridwen Salisbury
Civil Engineer

HEYNE TILLETT STEEL
4 Pear Tree Court, T: 020 7870 8050
London, EC1R 0DS M: 074 9045 0581
hts.uk.com

From: McDonald, Neil <Neil.McDonald@camden.gov.uk>
Sent: 30 October 2020 12:31
To: Hannah Willcock <hannah.willcock@dp9.co.uk>
Cc: Chana, Jaspreet <Jaspreet.Chana@camden.gov.uk>; Walsh, Jennifer <Jennifer.Walsh@Camden.gov.uk>; Berry-Khan, Gabriel <Gabriel.Berry-Khan@camden.gov.uk>; KMarcinkiewicz@hts.uk.com
Subject: FW: Chenies Street SuDS proposals (pre-app ref. 2020/3616/PRE)

Dear Hannah,

The flood risk consultant has contact our Sustainability Team about the drainage strategy for the site. They are a bit over-burdened at the moment although happy to help, but these things are better managed going through the planning officers at least in the first instance so would you mind arranging for the proposed draft drainage statement (or the key parameters they want considered in simple format with any questions, if preferred) to be forwarded to Jaspreet, cc-ing in myself given Jaspreet will still be off for a couple of weeks, and then we can see that the correct process is in train for you to be advised accordingly. Do also copy in Gabriel to save time if desired.

Many thanks and regards,

Neil McDonald
Team Manager (South), Development Management

Telephone: 020 7974 206

From: Krzysztof Marcinkiewicz <KMarcinkiewicz@hts.uk.com>
Sent: 29 October 2020 12:19
To: Ceridwen Salisbury <CSalisbury@hts.uk.com>; Frost, Katherine <Katherine.Frost@camden.gov.uk>; Berry-Khan, Gabriel <Gabriel.Berry-Khan@camden.gov.uk>
Cc: Dylan Chatterton <DChatterton@hts.uk.com>; Hannah Willcock <hannah.willcock@dp9.co.uk>
Subject: RE: Chenies Street SuDS proposals

For the avoidance of doubt, the pre-application reference is **2020/3616/PRE**

Regards,

Krzysztof Marcinkiewicz
Associate

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4 Pear Tree Court, T: 020 7870 8050
London, EC1R 0DS M: 07861 498 024
hts.uk.com

From: Ceridwen Salisbury <CSalisbury@hts.uk.com>
Sent: 29 October 2020 12:13

To: Katherine.Frost@camden.gov.uk; Gabriel.Berry-Khan@camden.gov.uk
Cc: Krzysztof Marcinkiewicz <KMarcinkiewicz@hts.uk.com>; Dylan Chatterton <DChatterton@hts.uk.com>
Subject: Chenies Street SuDS proposals

Dear Katherine and Gabriel,

HTS are the civil engineers on a scheme at Chenies Street in Camden that is currently being developed for planning.

We have developed a preliminary drainage scheme for the site that we would like to discuss with you prior to submission of the planning application, to solicit your comments and ensure that the scheme we put forward for planning is fully understood.

Would you be available for a (remote) discussion within the next week or two, please?

Kind regards
Ceridwen

Ceridwen Salisbury
Civil Engineer

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London, EC1R 0DS M: 074 9045 0581
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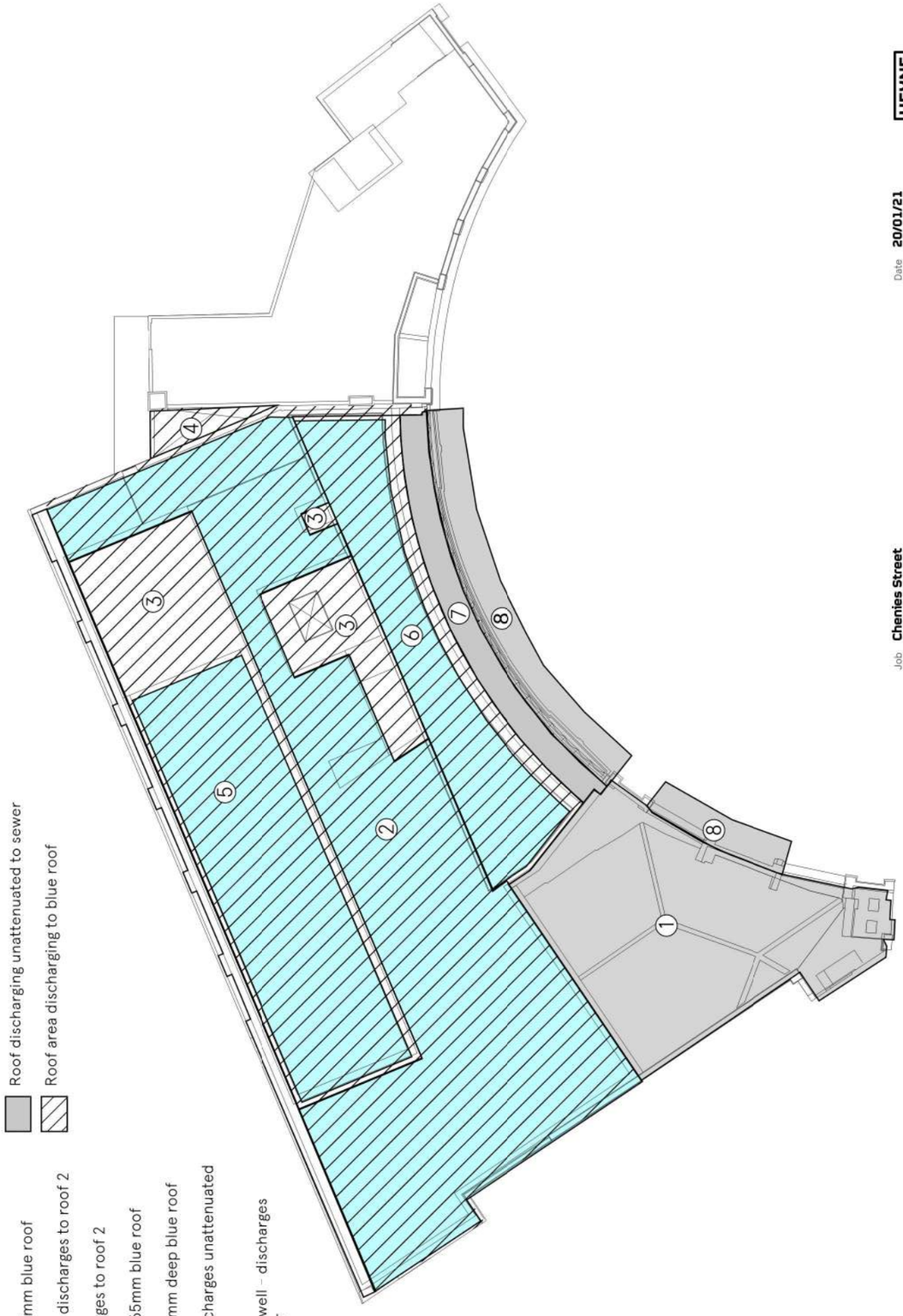


The London Sustainable Drainage Proforma

Introduction

This proforma is intended to accompany a drainage strategy prepared for a planning application where required by national or local planning policy. It should be used to summarise the key outputs from the strategy to allow assessing officers at the Lead Local Flood Authority (LLFA) to quickly assess compliance with sustainable drainage (SuDS) planning

The proforma is divided into 4 sections, which are intended to be used as follows:

1. Site and project information - Provide summary details of the development, site and drainage
2. Proposed discharge arrangement – Summarise site ground conditions to determine potential for infiltration. Select a surface water discharge method (or mix of methods) following the hierarchical approach set out in the London Plan.
3. Drainage strategy – Prioritise SuDS measures that manage runoff as close to source as possible and contribute to the four main pillars of SuDS; amenity, biodiversity, water quality and water quantity.
4. Supporting information – Provide cross references to the page or section of the drainage strategy report where the detailed information to support each element can be found. This may be more than one reference for each

Policy

Drainage strategies for developments in the London Borough of [insert borough] need to comply with the following policies on SuDS:

1. Camden Local Plan Policy CC3
2. London Plan policy 5.13 and draft New London Plan policy SI13
3. The National Planning Policy Framework (NPPF)

Technical Guidance

- Post-development surface water discharge rate should be limited to greenfield runoff rates. Proposals for higher discharge rates should be agreed with the LLFA ahead of submission of the Planning Application. Clear evidence should be provided with the Planning Application to show why greenfield rates cannot be achieved.
- Greenfield runoff rate is the runoff rate from a site in its natural state, prior to any development. This should be calculated using one of the runoff estimation methods set out in Table 24.1 of CIRIA C753 The SuDS Manual.
- Attenuation storage volumes required to reduce post-development discharge rates to greenfield rates should be calculated using one of the runoff estimation methods set out in Table 24.1 of CIRIA C753 The SuDS Manual.
- ‘CC’ refers to climate change allowance from the current Environment Agency guidance.
- An operation and maintenance strategy for proposed SuDS measures should be submitted with the Planning Application and include the details set out in section 32.2 of CIRIA C753 The SuDS Manual. The manual should be site-specific and not directly reproduce parts of The SuDS Manual.
- Other useful sources of guidance are:
  - Camden Planning Guidance 'Water and Flooding'
  - The London Plan Sustainable Design and Construction SPG
  - DEFRA non-statutory technical standards for sustainable drainage
  - Environment Agency climate change guidance
  - CIRIA C753 The SuDS Manual
  - Camden's 'SuDS in planning applications' webpage

Appendix D

SuDS Proforma

Camden

GREATER LONDON AUTHORITY

LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	Chenies Street
Address & post code	Telephone Exchange & Minerva House, North Crescent off Chenies Street, Bloomsbury, WC1E 7PH
OS Grid ref. (Easting, Northing)	E 529578
	N 181869
LPA reference (if applicable)	2020/3616/PRE
Brief description of proposed work	Unification of two adjacent buildings with openings made through the party wall. New shared core, additional floors and lowering of part of the basement.
Total site Area	1714 m^2
Total existing impervious area	1714 m^2
Total proposed impervious area	1714 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	Yes: CDA Group3_005
Existing drainage connection type and location	Combined outfalls to combined sewers under North Crescent and Alfred Mews.
Designer Name	C Salisbury
Designer Position	Civil Engineer
Designer Company	Heyne Tillet Steel

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	Lynch Hill Gravel Member
Bedrock geology classification	London Clay
Site infiltration rate	N/A m/s
Depth to groundwater level	4.7-5.0 m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	Y	Y
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
3 attenuate rainwater in ponds or open water features for gradual release	N	N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
5 discharge rainwater direct to a watercourse	N	N
6 discharge rainwater to a surface water sewer/drain	N	N
7 discharge rainwater to the combined sewer.	Y	Y

2c. Proposed Discharge Details

Proposed discharge location	TW sewers in North Crescent, Alfred Mews
Has the owner/regulator of the discharge location been consulted?	Pre-planning enquiry has been submitted

Camden

GREATERLONDONAUTHORITY

LoDEG

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.22			
1 in 1	0.18	18.4	53	4.7
1 in 30	0.5	56.4	98	14.1
1 in 100	0.69	74.9	138	18.6
1 in 100 + CC			202	25.5
Climate change allowance used		40%		

3b. Principal Method of Flow Control	Blue roofs

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	1343	1125	122
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	0		0
Total	**1343**	**1125**	**122**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Section 3.5
Drainage hierarchy (2b)	Section 5.1
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 5.1
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5.1, Appendix D
Proposed SuDS measures & specifications (3b)	Section 5.1

4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix A
Detailed drainage design drawings, including exceedance flow routes	Image 9
Detailed landscaping plans	-
Maintenance strategy	Section 5.3
Demonstration of how the proposed SuDS measures improve:	
a) water quality of the runoff?	Section 5.1
b) biodiversity?	Section 5.1
c) amenity?	Section 5.1

Appendix E

Proposed Hydraulic Calculations

ACO Blue Roof Calculator Version 1.0.0.36

Project Title
Chenies Street

Design Number

Notes / Reference
3rd Floor Terrace

Design Storm Event	1:100
Climate Change %	40%
Location	London
Roof Area m²	105.0
Additional Contributing Areas (m²)	
Total Catchment Area (m²)	**105.0**
Net Roof Area (m²)	60.0
Permitted Outflow (l/s)	0.900
Blue or Blue/Green Roof	Blue / Green
If B/G, Green Roof Type	Extensive
a. Permanent reservoir above or in storage void	None
b. Required Reservoir Depth (mm)	

Required Net Storm Storage Volume (m³)	4.40
Total Net Volume Required (m³)	4.40
Void Ratio	0.90
Selected depth of storage tank (mm)	85

R: l/s

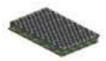
M5-60: mm/h

DURATION (mins)	INTENSITY (mm/h)	REQUIRED STORAGE VOLUME (m³)
5 mins	455.04	3.71
10 mins	270.56	4.19
15 mins	178.42	3.87
30 mins	114.66	4.40
1 hour	69.93	4.10
2 hours	44.94	2.96
4 hours	27.69	0.00
6 hours	20.31	0.00
10 hours	13.37	0.00
24 hours	6.23	0.00
48 hours	3.33	0.00

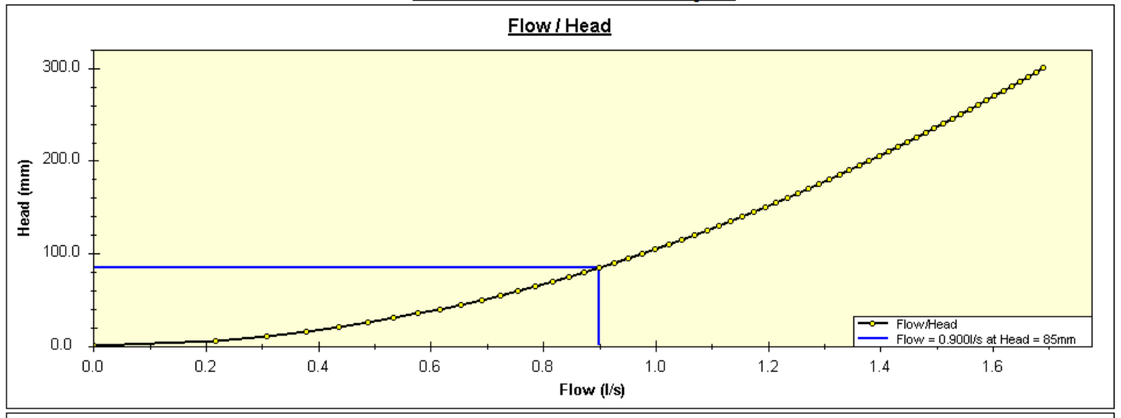
Structural Load Calculations

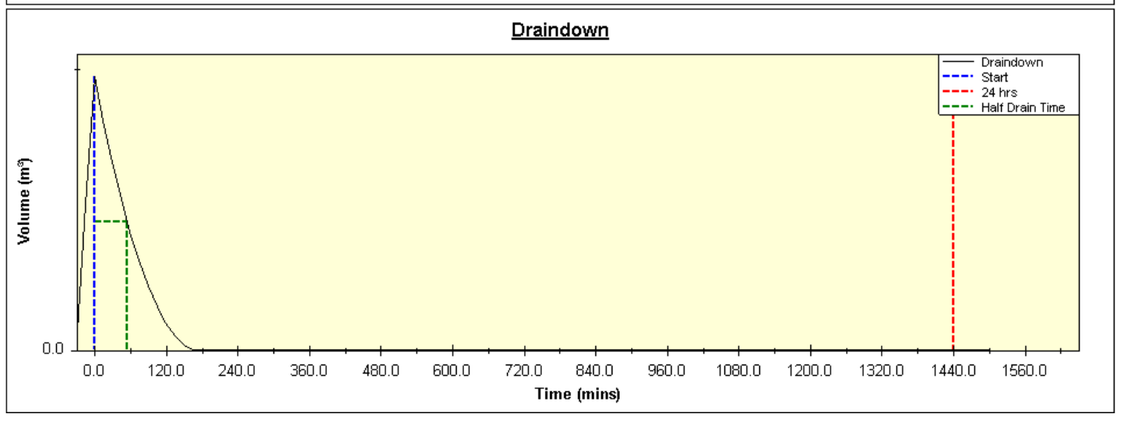
Item	kN/m²
Weight of Product (Tank / Cell)	0.111
Weight of Product (Tray)	0.000
Geotextile	0.004
Weight of Permanent Storage	0.000
Weight of Stormwater Storage	0.750

Half Draindown time: 55 mins

	Required (m²)	Depth (mm)	Gross Volume (m³)	Net Volume (m³)	Layers Required	Product No.	Description	Qty	Unit
	60.0	85	5.10	4.59	1	110001	RoofBloxx Tank 85	240	pcs
	60.0	30	1.80	1.71	1	110008	RoofBloxx Cell 30	240	pcs
	0	0	0	0	0			0	pcs
	0					110011	Capilliary Wicking Rope	0	Rolls
	63					27041	ACOTex Plus Protection Fleece (300gsm) 100 x 4.0m	1	Rolls
	63					27038	ACOTex Filter geotextile (125gsm) 100 x 4.0m	1	Rolls

Level & Draindown Graphs





ACO Technologies plc
ACO Business Park, Hitchin Road, Shefford, Bedfordshire SG17 5TE
Tel: 01462 816666 Fax: 01462 815895
email: technologies@aco.co.uk website: www.aco.co.uk

For our dedicated stormwater management team, please contact:
uk-swc@aco.co.uk Tel: 01462 816666

ACO Blue Roof Calculator Version 1.0.0.36

Project Title
Chenies Street

Design Number

Notes / Reference
4th Floor Terrace

Design Storm Event	1:100
Climate Change %	40%
Location	London
Roof Area m²	85.0
Additional Contributing Areas (m²)	
Total Catchment Area (m²)	**85.0**
Net Roof Area (m²)	65.0
Permitted Outflow (l/s)	0.400
Blue or Blue/Green Roof	Blue / Green
If B/G, Green Roof Type	Extensive
a. Permanent reservoir above or in storage void	None
b. Required Reservoir Depth (mm)	

Required Net Storm Storage Volume (m³)	4.76
Total Net Volume Required (m³)	4.76
Void Ratio	0.90
Selected depth of storage tank (mm)	85

R: l/s

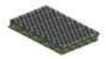
M5-60: mm/h

DURATION (mins)	INTENSITY (mm/h)	REQUIRED STORAGE VOLUME (m³)
5 mins	455.04	3.10
10 mins	270.56	3.59
15 mins	178.42	3.43
30 mins	114.66	4.15
1 hour	69.93	4.50
2 hours	44.94	4.76
4 hours	27.69	3.66
6 hours	20.31	1.72
10 hours	13.37	0.00
24 hours	6.23	0.00
48 hours	3.33	0.00

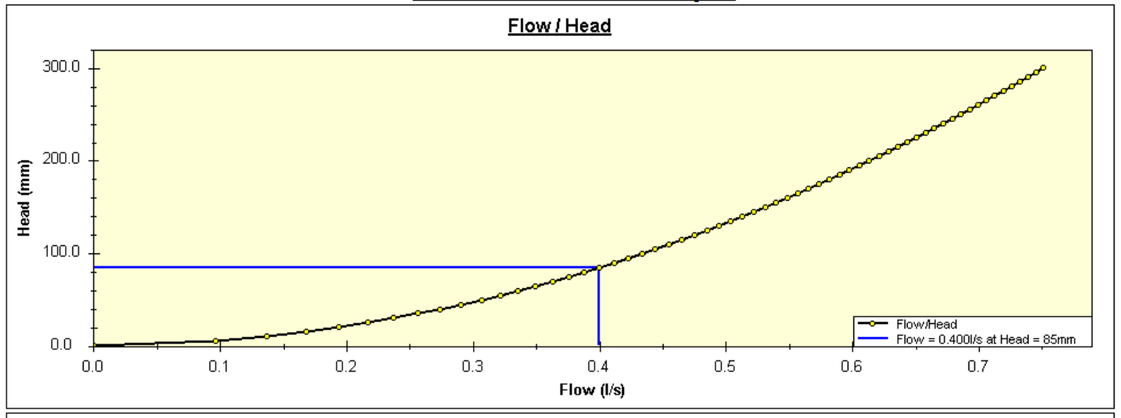
Structural Load Calculations

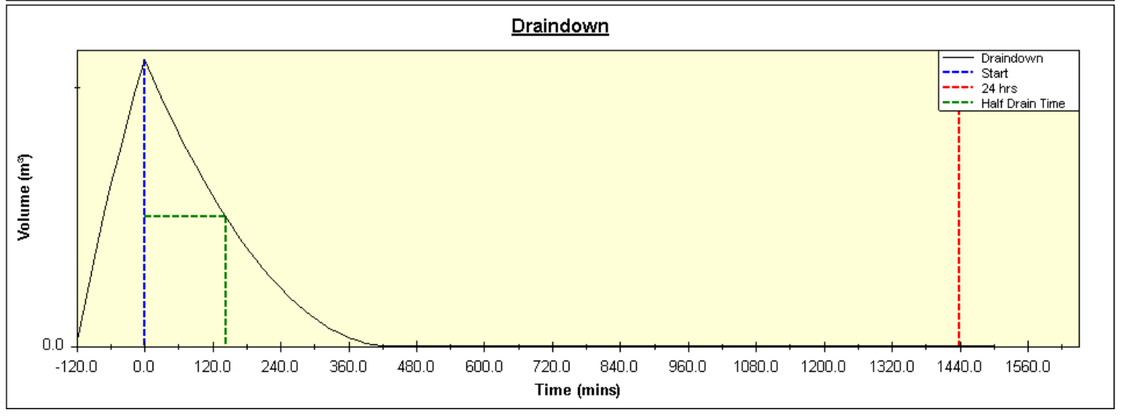
Item	kN/m²
Weight of Product (Tank / Cell)	0.111
Weight of Product (Tray)	0.000
Geotextile	0.004
Weight of Permanent Storage	0.000
Weight of Stormwater Storage	0.750

Half Draindown time: 144 mins

	Required (m²)	Depth (mm)	Gross Volume (m³)	Net Volume (m³)	Layers Required	Product No.	Description	Qty	Unit
	65.0	85	5.53	4.97	1	110001	RoofBloxx Tank 85	260	pcs
	65.0	30	1.95	1.85	1	110008	RoofBloxx Cell 30	260	pcs
	0	0	0	0	0			0	pcs
	0					110011	Capilliary Wicking Rope	0	Rolls
	69					27041	ACOTex Plus Protection Fleece (300gsm) 100 x 4.0m	1	Rolls
	69					27038	ACOTex Filter geotextile (125gsm) 100 x 4.0m	1	Rolls

Level & Draindown Graphs





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For our dedicated stormwater management team, please contact:
uk-swc@aco.co.uk Tel: 01462 816666

ACO Blue Roof Calculator Version 1.0.0.36

Project Title: Chenies Street

Design Number:

Notes / Reference: Flat Roof

Design Storm Event	1:100
Climate Change %	40%
Location	London
Roof Area m²	1150.0
Additional Contributing Areas (m²)	
Total Catchment Area (m²)	**1150.0**
Net Roof Area (m²)	1000.0
Permitted Outflow (l/s)	1.500
Blue or Blue/Green Roof	Blue / Green
If B/G, Green Roof Type	Extensive
a. Permanent reservoir above or in storage void	None
b. Required Reservoir Depth (mm)	

Required Net Storm Storage Volume (m³)	107.77
Total Net Volume Required (m³)	107.77
Void Ratio	0.90
Selected depth of storage tank (mm)	125

R: l/s

M5-60: mm/h

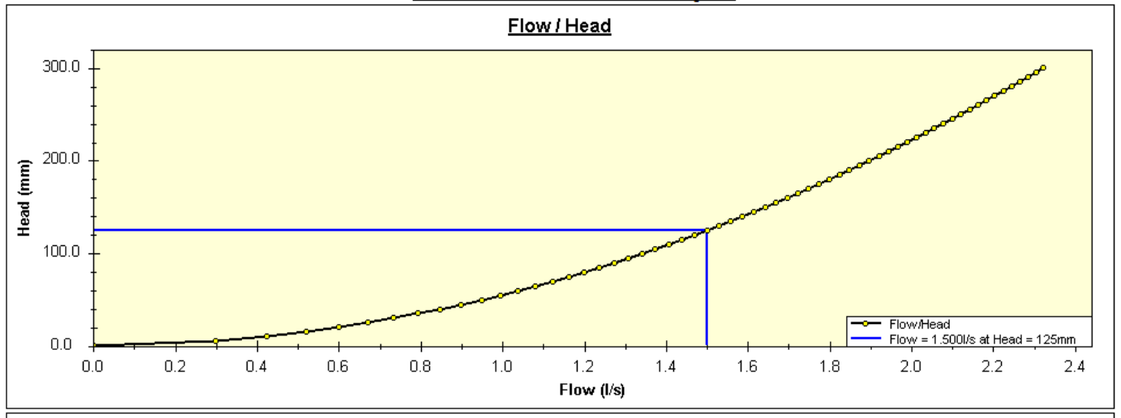
DURATION (mins)	INTENSITY (mm/h)	REQUIRED STORAGE VOLUME (m³)
5 mins	455.04	43.16
10 mins	270.56	50.96
15 mins	178.42	49.94
30 mins	114.66	63.23
1 hour	69.93	75.02
2 hours	44.94	92.56
4 hours	27.69	105.78
6 hours	20.31	107.77
10 hours	13.37	99.76
24 hours	6.23	42.35
48 hours	3.33	0.00

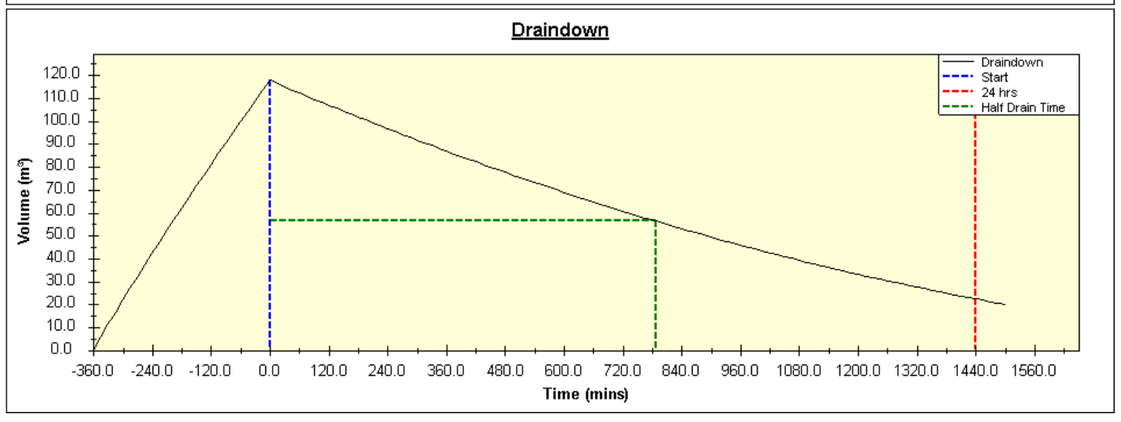
Half Draindown time: 788 mins

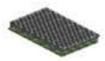
Structural Load Calculations

Item	kN/m²
Weight of Product (Tank / Cell)	0.154
Weight of Product (Tray)	0.000
Geotextile	0.004
Weight of Permanent Storage	0.000
Weight of Stormwater Storage	1.103

Level & Draindown Graphs





	Required (m²)	Depth (mm)	Gross Volume (m³)	Net Volume (m³)	Layers Required	Product No.	Description	Qty	Unit
	1000.0	125	125.00	112.50	1	110002	RoofBloxx Tank 125	4000	pcs
	1000.0	30	30.00	28.50	1	110008	RoofBloxx Cell 30	4000	pcs
	0	0	0	0	0			0	pcs
	0					110011	Capilliary Wicking Rope	0	Rolls
	1050					27041	ACOTex Plus Protection Fleece (300gsm) 100 x 4.0m	3	Rolls
	1050					27038	ACOTex Filter geotextile (125gsm) 100 x 4.0m	3	Rolls

ACO Technologies plc
ACO Business Park, Hitchin Road, Shefford, Bedfordshire SG17 5TE
Tel: 01462 816666 Fax: 01462 815895
email: technologies@aco.co.uk website: www.aco.co.uk

For our dedicated stormwater management team, please contact:
uk-swc@aco.co.uk Tel: 01462 816666

Appendix F

Thames Water Pre-Planning Enquiry

Pre-planning enquiry

Application form

Please complete this form and return it to us at
developer.services@thameswater.co.uk or
Thames Water, Developer Services, Clearwater Court,
Vastern Road, Reading, RG1 8DB.

Application for a pre-planning enquiry

Please complete ALL relevant sections of this form in BLOCK CAPITALS

Use this form to find out if there's existing capacity in our network for your proposed development. Please ensure you complete the form in full and we'll respond within 21 calendar days from receipt of your completed application form. We'll let you know if sufficient capacity already exists in the network or if further modelling will be needed to determine if network adjustments or reinforcement will be required.

Is your application for: Water and sewerage ☐ Water ☐ Sewerage ■ (Please tick one.)

Section A - About you

(i) Details of applicant

Company name	Heyne Tillett Steel
	Developer ☐ Consultant ■ Land promoter ☐ SLP ☐ NAV ☐ Other ☐
Title	Mr ☐ Mrs ☐ Ms ■ Miss ☐ Dr ☐ Other ☐
First name(s)	Ceridwen
Last name	Salisbury
Preferred phone no.	07490450581
Alternative phone no.	020 7870 8050
Email address	csalisbury@hts.uk.com
Full postal address	Address line 1: 4 Pear Tree Court
	Address line 2: Farringdon
	Town: London
	County: ☐ Postcode: EC1R 0DS

(ii) Who should we contact to discuss the application?

Applicant ■ Nominated contact ☐ (Please tick one.)

If nominated contact:

Company name	☐
	Developer ☐ Consultant ☐ Land promoter ☐ SLP ☐ NAV ☐ Other ☐
Title	Mr ☐ Mrs ☐ Ms ☐ Miss ☐ Dr ☐ Other ☐
First name(s)	☐

Continued...

Last name

Preferred phone no.

Alternative phone no.

Email address

Full postal address

Address line 1

Address line 2

Town

County

Postcode

Section B - About the site

(i) Your site address

Same as applicant ☐ Same as nominated contact ☐ At another location ■ (Please tick one.)

If another location:

Site name Minerva House and the Telephone Exchange

Full postal address

Address line 1 Minerva House and the Telephone Exchange

Address line 2 North Crescent, off Chenies Street

Town London

County

Postcode WC1E 7PH

Does the developer own the site? Yes ■ No ☐ Don't know ☐

What is the local authority? London Borough of Camden

Ordnance Survey grid ref 529578 181869

Type of site Greenfield ☐ Brownfield ■ Mixed ☐

How big is the site? 0.1670 hectares

(ii) Your planning status (If you've already started the planning process).

Is the development identified in the local plan? Yes ☐ No ■ Don't know ☐ If Yes, reference number

Does it have outline planning permission? Yes ☐ No ■ Don't know ☐ If Yes, reference number

Does it have full planning permission? Yes ☐ No ■ Don't know ☐ If Yes, reference number

Does the development have building regulations permission? Yes ☐ No ■ Don't know ☐

(iii) Your development

To enable us to determine whether the capacity is sufficient or whether further modelling and reinforcement of our network will be required please provide details of the properties currently existing on the site (where applicable) and how you will phase your development. The information you provide at this stage will help improve the accuracy of our assessment. If you have more than 6 phases for your development please add details on a separate sheet.

		Proposed site						
Property type	**Existing site to be demolished**	**Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Total**
Start on site date								
Date of Occupation								
General housing (total units)								
Flat (total units)								
Primary school (max. pupil capacity)								
Secondary school (max. pupil capacity)								
Boarding school (max. pupil capacity)								
Assembly hall (max. capacity)								
Cinema (max. capacity)								
Theatre (max. capacity)								
Sports hall (max. capacity)								
Hotel (total bedrooms)								
Guest house (total bedrooms)								
Motel (total bedrooms)								
Holiday apartment (total capacity)								
Leisure park (max. capacity)								
Caravan park standard (total spaces)								
Caravan site standard (total spaces)								
Camping site standard (total spaces)								
Camping site serviced (total spaces)								
Student accommodation (max. capacity)								
Public house (max. capacity)								
Restaurant / Day care centre (max. capacity)								
Drive in restaurant (max. capacity)								
Hospital (total beds)								
Nursing / Care home (total beds)								
Offices (gross internal area in m^2)	5513	8267						
Shopping centre (gross internal area in m^2)								
Warehouse (gross internal area in m^2)								
Commercial premises (gross internal area in m^2)								
Manufacturing unit (gross internal area in m^2)								
Other (please state units and description)								

Section C - About the water supply
(Not required if only applying for sewerage connection).

(i) Phasing water supply for your development

If you already have a plan for the phasing of your development please give details below.

Property type	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Date water connection required						
Estimated peak clean water flow rate (litre/sec)						
Break tank capacity, if any (m^3)						

If you're using a break tank please advise what measures you plan to take to avoid high peak flow over a short period of time.

Section D - About your sewerage connections
(Not required if only applying for water connection).

(i) Your existing sewerage connections (brownfield site only).

Please give us details of your existing connections.

	Foul water	Surface water
Does the site have the following sewerage connections?	☐	☐
What is the type of discharge method?	☐ Gravity	☐ Gravity
	☐ Pumped	☐ Pumped
If sewage is pumped, what is the pump rate?	☐ litres/sec	☐ litres/sec
What is the existing impermeable area per connection?		1670 m^2
What are the existing connection points? (For example, 'X' properties to TW manhole ref 'Y')	Site discharges to the 940 x 635 combined sewer to the south-east of the site under North Crescent (near TWMH 5803 and TWMH 6811) and to the 1143 x 737 combined sewer to the rear of the site under Alfred Mews (near TWMH 5805).	SW runoff rates calculated for 1:100-year event (FEH method) + 40% climate change Existing site outflow rate = 109l/s Site discharges to sewers as for foul water.

(ii) Your proposed sewerage connections

Please give us details of your proposed connections.

	Foul water	Surface water
Does the site have the following sewerage connections?	☐	☐
What is the type of discharge method?	☐ Gravity	☐ Gravity
	☐ Pumped	☐ Pumped
If sewage is pumped, what is the pump rate?	☐ litres/sec	☐ litres/sec
What is your proposed approach to surface water drainage?		☐ Sustainable drainage system (SuDS) ☐ Traditional piped system
Do you propose using separate highway surface water drainage systems?		☐ Yes ☐ No
If the surface water rate is attenuated, to what rate is it attenuated?		35.4 litres/sec
What is the proposed impermeable area per connection?		1670 m^2
What are the proposed connection points? (For example, 'X' properties to TW manhole ref 'Y')	Site continues to discharge as existing to sewers beneath North Crescent and Alfred Mews.	SW runoff rates calculated for 1:100-year event + 40% climate change. 1254sq.m roof area will be attenuated in blue roofs to a peak flow-rate of 1.1l/s. Pitched roof and lightwell areas discharge unattenuated: these have a total area of total area 416sq.m and discharge at a peak flow-rate of 34.3l/s. This yields an overall site peak flow-rate of 35.4l/s which represents a betterment to existing site outflow rate of 68%. Outfalls are as for foul water, to sewers beneath North Crescent and Alfred Mews.

Please note: The developer is expected to follow the local authority's drainage strategy and be able to demonstrate how the proposed (attenuated) discharge rate of any surface water flows have been calculated. For developments in Greater London, please refer to the London Plan Drainage Hierarchy (Policy 5.13). We will challenge the rates provided if they are not in line with those based on the local drainage strategies.

Section E - What next?

(i) What we need to process your application:

- [x] **Completed application** (ensure all relevant sections of this form are completed in full)
- [x] **Site location plan** (showing the site with nearby buildings, road and any sewers)
- [ ] **Scaled site layout** (showing existing and proposed layouts including Point of Connection to our water network)
- [x] **Site drainage strategy plan** (if available at this stage showing all proposed sewers, pipe sizes and gradients)
- [ ] **CCTV and topographical surveys** (if available for existing brownfield sites)

Please make sure any attachments are in PDF format and don't exceed a total of 20MB in size per email. All drawings must be of suitable detail and have a drawing reference number on them.

Please note: without this information we may need to make assumptions about your requirements when calculating your budget estimate (if requested).

(ii) How we'll use this information

We'll use the information you give on this application form, and potentially share it with our delivery partners, to provide the service you've requested.

This could include contacting you to discuss your application and/or provide more details, visiting the site where work needs to be carried out and invoicing you when appropriate. Your feedback is important to us, so we may also use the information to ask for your feedback on how we can improve our performance.

We won't use this information for marketing purposes without contacting you to seek your consent.

You can find Thames Water's privacy policy at **thameswater.co.uk/Legal/Privacy**.

(iii) Declaration

Print name	Ceridwen Salisbury
Job title	Civil Engineer
Company	Heyne Tillett Steel
Date	20.01.2021
Signature	Ceridwen Salisbury Digitally signed by Ceridwen Salisbury DN: C=GB, E=csalisbury@hts.uk.com, O=Heyne Tillett Steel, OU=Consultant, CN=Ceridwen Salisbury Date: 2020.07.23 16:51:43+01'00'

(iv) Submitting your application

Please send your completed form to receive your capacity check in 21 calendar days:

Via email:

developer.services@thames water.co.uk

Or send to:

Thames Water Developer Services, Clearwater Court, Vastern Road, Reading RG1 8DB

Getting in touch

For enquiries regarding this application or any other questions relating to your building or development work please contact us:

thameswater.co.uk/developerservices

developer.services@thameswater.co.uk

0800 009 3921
Monday – Friday, 8am – 5pm

Thames Water,
Developer Services,
Clearwater Court,
Vastern Road,
Reading,
Berkshire RG1 8DB

Thames Water

04/19

Appendix G

Inspection and Maintenance Strategy

2429 – Chenies Street
January 2021

Drainage Inspection and Maintenance Strategy

This document has been prepared to support the inspection and maintenance of the proposed below ground drainage at Minerva House and the Telephone Exchange at the Chenies Street site. The drainage network comprises surface and foul water drainage systems:

- Surface water network will route all the rainwater towards existing outfalls to the Thames Water combined sewers. A combination of blue and blue-green roofs will collect rainwater falling on the site.

- Foul water network from above ground level will be routed towards the public sewer network under gravity and via pumping station(s).

In accordance with CIRIA C625 it is recommended that a private SuDS maintenance agreement is undertaken as a simple contract between the property owner and the maintenance provider (the maintainer). It is mainly to facilitate continuing maintenance of the SuDS that are in private ownership. The maintenance requirements are in accordance with the CIRIA C753 SuDS Manual 2015 and product manufacturer's requirements.

The following Drainage / SuDS measures are proposed within the development:

- General Drainage:

Maintenance Period	Maintenance Task	Frequency
Regular maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly
	Inspect surface structures and covers removing obstructions and silt as necessary.	Monthly or as required
	Check there is no physical damage	
	Remove overgrown vegetation 1m min. around structures and keep hard aprons free from silt and debris.	
Occasional Maintenance	Remove sediment from pre-treatment structures (e.g. gullies, channels silt traps).	Six-monthly or as required
	Remove cover and inspect inside, ensuring water is flowing freely and that the exit route for water is unobstructed.	Annually or as required
	Remove debris and silt.	
	Undertake inspection after leaf fall in autumn.	
Remedial Actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect all manholes, inspection chambers, inlets, outlets, overflows and vents to ensure they are in good condition and operating as designed	Annually or after large storms.

- Green / Blue / Brown Roofs:

Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	During establishment, replace dead plants as required (for 12 months following installation)	Monthly
	Mow grasses (where required) and remove resultant clippings	
	Remove fallen leaves and debris from deciduous plant foliage	Six Monthly
	Remove nuisance and invasive vegetation, including weeds	
	Remove debris & litter to prevent clogging of inlet drains and interference with plant growth	
	Noxious weed treatment (3 times a year)	
Occasional Maintenance	Replace dead plants as required (typically in the Autumn)	Annually
	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, take action where required	
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources, take action where required	
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system, take action where required	
	Inspect underside of roof for evidence of leakage, take action where required	
	Inspect and document the presence of wildlife	
Remedial Action	Inspect and carry out essential recovery works to return the feature to full working order	Following all significant storm events

- Pump Installations:

Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Visual inspection of the unit. Rise and inspection of the pump. Seal chamber oil check. Level control equipment cleaned and tested. Inspection and test of Control Panel functionality. Motor Insulation tested and recorded.	Annually or as agreed with manufacturer to maintain efficient and reliable system in operation
Remedial Action	Repair / rehabilitation of inlets, outlets, vents and other components.	As required or stated by manufacturer

Reference shall be made to CIRIA publication C753 (The SuDS Manual) and to the relevant maintenance guidance from the products manufacturers.

HEYNE TILLETT STEEL

bsi. ISO 9001 Quality Management
FS 592987