

SAVILLE THEATRE 135 SHAFTESBURY AVENUE

SUSTAINABLE URBAN DRAINAGE 105465-PEF-ZZ-XX-DR-CD-000001-S2-P03_SDR

PELL FRISCHMANN

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1 Introduction & Report Context

1.1 Context and Commission

- 1.1.1 Pell Frischmann has been commissioned to develop a Sustainable Drainage Strategy to support a planning application for the refurbishment and extension of the existing building at 135 Shaftesbury Avenue. This development shall hereafter be referred to as the Saville Theatre.
- 1.1.2 This Sustainable Drainage Report will (SDR) will set out the key principles of the proposed surface and foul water drainage strategies and demonstrate accordance with local and national guidance and best practice.
- 1.1.3 This includes justification of:
 - Outfall locations;
 - Discharge rates;
 - Volume of attenuation required on site;
 - > Sustainable Drainage Systems to be included within proposals

1.2 Information Consulted

- 1.2.1 A review of relevant information has been consulted to develop an appropriate drainage strategy for the development as follows:
 - > National Planning Policy Framework (NPPF), December 2023;
 - Planning Practice Guidance (PPG), August 2022;
 - > Non-statutory technical standards for sustainable drainage systems, March 2015;
 - Sewerage Sector Guidance, October 2019;
 - > The SuDS Manual C753 Version 6, 2015;
 - > Camden & Greater London Authority Sustainable Drainage Proforma;
 - Approved Document H, Building Regulations;
 - > Camden Borough Council Strategic Flood Risk Assessment, 2014,
- 1.2.2 Pell Frischmann have been commissioned by Yoo Capital to develop a sustainable drainage strategy to support a detailed planning application. This document should be read in tandem with Pell Frischmann Flood Risk Assessment reference *105465-PEF-ZZ-XX-RP-YE-000010*.

2 Existing Site

2.1 Site Location and Existing Use

- 2.1.1 The footprint of the site, and thus the site boundary is approximately 800m² in size and is currently in use as a cinema.
- 2.1.2 The site is bound to the southwest by Stacey Street, the south east by Shaftesbury Avenue, the Northeast by St Giles Passage, and the Northwest by New Compton Street.
- 2.1.3 The site location can be seen below in **Figure 2-1**.



Figure 2-1 Site Location Plan

2.2 Topography

- 2.2.1 As previously mentioned, the application area is entirely occupied by an existing building. This building is accessed from various points at different levels, as can be seen from the stepped access at the front of the building.
- 2.2.2 The wider topography of the area shows levels fall from North to South.
- 2.2.3 The topography as discussed above can be seen for the site and surrounding area in **Figure 2-2**.

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Figure 2-2 LiDAR Elevation Data

2.3 Existing Drainage Regime

Existing Surface Water Drainage Features

- 2.3.1 Given the existing use of the site as a cinema, it is assumed that the existing building is served by a traditional drainage system above ground a system of gutters and down pipes convey roof runoff into the surrounding public sewerage network.
- 2.3.2 The interaction with the system serving the foul water generated by the building is unknown including the point at which the foul and surface water systems converge. This is discussed in **Section 4**.
- 2.3.3 An extract of the sewer records for the area can be seen below in **Figure 2-3**.



Extract of Local Thames Water Sewer Network Figure 2-3

Existing runoff rate

- The existing runoff rate has been assessed using a notional network model to calculate the peak runoff 2.3.4 generated by a 15-minute event on the footprint of the building for several key return periods.
- 2.3.5 The calculated existing runoff rates pertaining to the site are summarised below in Table 2-1. The calculations for the below can be seen in Appendix A.
- The 100 year + 40% Climate Change event peak runoff rate of 81.3l/s can be conveyed by a 300mm 2.3.6 pipe laid at 1:100. It is likely that the existing building has multiple connections to the public sewer network.

Table 2-1 Runoff Ra	ates for existing site
Return Period	Peak Runoff Rate (I/s)
2	16.8
30	43.9
100 (+40% Climate Change)	81.3

Existing Runoff Volume

In accordance with clause S5 in Non-statutory technical standards for sustainable drainage systems; 2.3.7

S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

- 2.3.8 The greenfield runoff volume for the 360-minute, 100-year return period event is calculated at 12.1m³. The calculations for this event can be seen in **Appendix B**.
- 2.3.9 The runoff volume for the existing site in its developed nature for the 360-minute, 100-year return period event calculated at 70m³. Calculations for this can be seen in **Appendix C**.

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2.3.10 Detailed designs should therefore adhere to the requirements outlined above.

Existing Surface Water Runoff Routing

2.3.11 The existing runoff generated by the site will be naturally directed toward local low points should the drainage infrastructure fail or exceed its inherent capacity. This will result in general direction of flow towards the low point within the A401 to the east of the site in accordance with Surface Water Flood Routing. This can be seen in **Figure 2-4** below.



Figure 2-4 Risk of Flooding From Surface Water Mapping

2.4 Groundwater

- 2.4.1 As discussed in the aforementioned Pell Frischmann Flood Risk Assessment, the overall risk of groundwater flooding to the site is classified as low due to the Camden Borough Council's SFRA suggesting that it lies within an area of deep groundwater.
- 2.4.2 This suggests that changes in the level of water table within the site have little impact on the current drainage of the site in its undeveloped state.

3 Proposed Surface Water Drainage Strategy

3.1 Drainage Hierarchy Assessment

- 3.1.1 Prevailing local and national guidance (including being prescribed in Approved Document H of Building Regulations) dictates that surface water runoff from a development should be disposed of as high up the following hierarchy as reasonably practicable;
 - > Water reuse, where a need is identified;
 - > Into the ground (infiltration), where ground conditions permit;
 - > To a surface water body or watercourse;
 - > To a surface water sewer, highway drain, or another drainage system;
 - To a combined water sewer;
- 3.1.2 The overall aim of the drainage hierarchy is to manage surface water runoff close to where it falls and to mimic pre-existing drainage regimes.
- 3.1.3 A development-wide water reuse system should be considered within proposals to make use of runoff generated by the footprint of the building. This could include storage and greywater repurposing for e.g. irrigation for planting, laundry services etc.
- 3.1.4 It is likely to be unfeasible to manage the entire runoff via reuse, ergo an offsite discharge will be required.
- 3.1.5 The site is underlain by London Clay Formations, thus the potential use of infiltration as a means of surface water disposal is to be unlikely.
- 3.1.6 The next preferrable method for surface water disposal is a local waterbody or watercourse. The site's location, being far removed from any open watercourses, precludes this from being a feasible option.
- 3.1.7 The next most appropriate receptor for surface water should therefore be the public sewerage network. Figure 2-3 shows that a comprehensive combined sewer network serves the local area and therefore represents a feasible method of surface water disposal.
- 3.1.8 As discussed earlier in this report, it is assumed that surface water currently drains from the site into the public sewerage network and therefore the methodology outlined in this section follows existing drainage patterns.

3.2 Outfall assessment

- 3.2.1 In order to prove the existing surface water sewer has capacity, Thames Water have been consulted on impacts of the development on the existing sewerage network. Results of this assessment for surface water are yet to be provided however it is considered that no impact will be made on the existing network due to the continuity of total impermeable area.
- 3.2.2 An improvement to the current situation is likely, given the proposed reduction in surface water runoff rates discharging into the public system.
- 3.2.3 It is recommended that a survey is commissioned to better understand the existing drainage connections from the cinema into the public network.

3.3 Approach to Surface Water Runoff Management

- 3.3.1 It is proposed that a runoff rate restriction will be imposed on rainfall falling onto the roof of the building, the resultant required attenuation volume is proposed to be provided within a blue roof structure. The building footprint is approximately 800m², representing no net change to existing conditions.
- 3.3.2 The equivalent greenfield runoff rate has been calculated using the ICPSuDS implementation of the IH124 method (see **Appendix D**). However, this results in a greenfield QBAR rate of 0.12l/s which at this stage is not considered a feasible rate to restrict to.

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- 3.3.3 As the site is brownfield in nature, any proposed surface water drainage strategy should seek to maximise the improvement over current rates, and strive to achieve the lowest possible discharge rate within the technical limits of the design.
- 3.3.4 Given the development proposals comprise the building footprint over the entire site area, the main opportunities for surface water attenuation are through the use of a blue roof storage system, and green roof source control measures.
- 3.3.5 Within the layout, approximately 550m² of footprint has been identified as appropriate for areas of blue roof, avoiding services and structural cores.
- 3.3.6 At this stage, it is assumed that 80% of this area is able to be utilised as blue roof construction, giving an area of 440m².
- 3.3.7 A 100mm blue roof construction depth has been assumed to assess the volume that can be provided within such a system; this must be confirmed with a specialist blue roof designer/provider in due course.
- 3.3.8 Assuming a standard 0.95 porosity of the blue roof modular units, a total volume of approximately 42m³ can be provided.
- 3.3.9 Based on the contributing area, this peak storage volume is shown in calculations to allow for an offsite discharge rate of 7l/s for all events up to the critical 1 in 100 year + 40% climate change event. This climate change allowance is in line with the Environment Agency's latest guidance on climate change allowances for drainage design¹.
- 3.3.10 An offsite discharge rate of 7l/s is equivalent to a 91% betterment on the current theoretical 1 in 100 year +40% discharge rate from a brownfield site. It also represents a 58% reduction on the 1 in 2 year brownfield rate for all events up to and including the 1 in 100 year+40%.
- 3.3.11 This strategy is based on the design parameters and constraints identified at this stage of the project. It demonstrates a feasible SuDS-based surface water drainage strategy for the scheme. Detailed design must review both the depth and area of blue roof attenuation systems that can be constructed to ensure the volume can be provided. It may be the case that the runoff rate can be altered to reflect the volume of storage possible at detailed design.

3.4 SuDS Strategy

- 3.4.1 While the volumetric strategy of attenuating water is carried out by inclusion of a blue roof as part of the roof construction, enhancements to water quality and addition of source control element will be delivered via inclusion of green roof areas.
- 3.4.2 There is the possibility of including water butts or small rain gardens on terraced floors on the northern elevation of the building to further add to source control and sustainable management of surface water. Opportunities for water reuse from the blue roof system could also be explored to provide irrigation to the green roof and cleaning/maintenance of the plant at roof level.

3.5 Principles of Maintenance and Adoption

- 3.5.1 For the proposed surface water drainage system to function correctly, it will need to be appropriately maintained. It is proposed that the drainage features on site are to be maintained by the operators of the building in its developed state.
- 3.5.2 The maintenance schedule adhered to for the network must be comprehensive and detail the specific maintenance requirements for each element of the drainage system.
- 3.5.3 For pipes, manholes and gullies, both general best practice and specific manufacturer maintenance protocols should be followed.

¹ Environment Agency (2022); *Flood risk assessments: climate change allowances*; available at <u>https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#peak-rainfall-intensity-allowance</u>

4 Proposed Foul Water Drainage Strategy

- 4.1.1 In its undeveloped state, the site has existing connection into the Thames Water sewer network.
- 4.1.2 It is proposed to reuse existing connections into the sewer network for the proposed site.
- 4.1.3 The peak flow rate to be generated by the development will be confirmed with Thames Water pending a detailed schedule of accommodation and commercial use within the building.

5 Summary

- 5.1.1 This report and supporting appendices demonstrate that an appropriate surface water drainage strategy has been developed for the site based on sustainable drainage principles in line with the relevant local and national policy and standards.
- 5.1.2 This Sustainable Drainage Report is intended to support a detailed planning application and as such the level of detail included is commensurate with the nature of the proposals. **Table 5-1** provides a summary of key information.

Table 5-1 Summary	of Key Information				
Торіс	Existing Site		Proposed Development		
Site Area (m ²)	800		800		
Impermeable Area (m ²)	800		800		
Number of Sub- Catchments	1		1		
Outfall Location(s)	Combined Sewer Ne	etwork	Combined Sewer Network		
	1 in 2-year	16.8			
	1 in 30-year	43.9	71/s		
Peak Runoff Rate (l/s)	1 in 100-year	81.3			
Proposed Storage Volume (m ³)	-		42m ³		
SuDS Features	-		Rainwater harvesting systems		
			Blue Roofs		
			Green Roofs		
Maintenance	Landowner		Landowner		
Responsibilities			Operators		

Appendix A Existing Runoff Rate Calculations

Pell Frischmann			Page 1
5 Manchester Square			
London			
W1U 3PD			Micco
Date 16/01/2024 14:55	Designed by TSturtr	ridge	
File D Existing runoff volume.MDX	Checked by		Diginarie
Innovyze	Network 2020.1		
CHODM CEVED DE	CICN by the Medified I	Dational Mathed	
STORM SEWER DE	SIGN by the Modified B	Rational Method	
De	esign Criteria for Sto	rm	
Pipe Siz	es STANDARD Manhole Sizes	STANDARD	
	FEH Rainfall Model		
Return Period (years)	100	Volumetric Runoff Coeff	. 1.000
EEU Deinfell Version	2012	PIMP (%) 100
FER Rainiali Version Site Location GB 528	2015 304 184308 TO 28304 84308	Add Flow / Climate Change (a Minimum Backdrop Height (m	(1) 0 200
Data Type	Point	Maximum Backdrop Height (m	1,500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s) 1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X	:) 500
I	Designed with Level Soffit	s	
Tin	ne Area Diagram for St	orm	
	Time Area Time Area		
	(mins) (ha) (mins) (ha)		
	0-4 0.061 4-8 0.018	3	
Total	Area Contributing (ha) =	0.079	
То	tal Pipe Volume (m³) = 2.2	232	
	@1982-2020 Innovvze		
	GIDON 2020 THHOAAS		

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5 Manchester Square		
London		
W1U 3PD		Micro
Date 16/01/2024 14:55	Designed by TSturtridge	Drainago
File D Existing runoff volume.MDX	Checked by	Drainage
Innovyze	Network 2020.1	
Netwo	rk Design Table for Storm	
PN Length Fall Slope I.Area (m) (m) (1:X) (ha)	T.E. Base k HYD DIA Section Type Auto (mins) Flow (l/s) (mm) SECT (mm) Design	
S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000	5.00 0.0 0.600 o 450 Pipe/Conduit 🔒 0.00 0.0 0.600 o 450 Pipe/Conduit 💣	
	etwork Results Table	
PN Rain T.C. US/IL	ΣI.Area ΣBase Foul Add Flow Vel Cap Flow	
(mm/hr) (mins) (m)	(ha) Flow $(1/s)$ $(1/s)$ $(1/s)$ (m/s) $(1/s)$ $(1/s)$	
\$1,000, 50,00, 5,07,0,000		
s1.001 50.00 5.11 -0.196	0.079 0.0 0.0 0.0 1.00 159.3 14.3	
<u>Free Flow</u>	ing Outfall Details for Storm	
0.1+f-11 0.1+f-	ll C Loval I Loval Min D I W	
Pipe Number Nam	e (m) (m) I. Level (mm) (mm) (m)	
S1.001	S 48.000 -0.202 0.000 0 0	
	©1982-2020 Innovyze	

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5 Manchester Square		
London		
W1U 3PD		Micro
Date 16/01/2024 14:55	Designed by TSturtridge	
File D Existing runoff volume.MDX	Checked by	Dialitage
Innovyze	Network 2020.1	
Simula	ation Criteria for Storm	
Volumetric Runoff Coeff 1.000 Manhole Head Areal Reduction Factor 1.000 Foul Sewage Hot Start (mins) 0 Additional Flow Hot Start Level (mm) 0 MADD Factor Number of Input Hydrographs 0 Num Number of Online Controls 0 Number	Loss Coeff (Global) 0.500 e per hectare (l/s) 0.000 Flow per Person per Day (l/per/day) w - % of Total Flow 0.000 f * 10m ³ /ha Storage 2.000 mber of Offline Controls 0 Number of Time/Area Diagrams 0 er of Storage Structures 0 Number of Real Time Controls 0	t 0.800 0.000 0 60 1
Synt	<u>hetic Rainfall Details</u>	
Rainfall Model Return Period (years) FEH Rainfall Version Site Location GB 52830 Data Type	FEH Summer Storms Yes 100 Winter Storms Yes 2013 Cv (Summer) 1.000 04 184308 TQ 28304 84308 Cv (Winter) 0.840 Point Storm Duration (mins) 30	
	01982-2020 Innovyze	

Pell Frischmann		Page 4
5 Manchester Square		
London		
W1U 3PD		Micro
Date 16/01/2024 14:55	Designed by TSturtridge	
File D Existing runoff volume.MDX	Checked by	Diamage
Innovyze	Network 2020.1	
100 year Return Period Summary of	Critical Results by Maximum Level (Rank 1) for Sto	orm
Areal Reduction Factor 1.000 Manhole Head Hot Start (mins) 0 Foul Sewag Hot Start Level (mm) 0 Additional Flo Number of Input Hydrographs 0 Nu Number of Online Controls 0 Numb	Simulation Criterialoss Coeff (Global) 0.500MADD Factor * 10m³/ha Storage per hectare (1/s) 0.000Inlet Coefficcienw - % of Total Flow 0.000 Flow per Person per Day (1/per/dayumber of Offline Controls 0 Number of Time/Area Diagrams 0oer of Storage Structures 0 Number of Real Time Controls 0	e 2.000 t 0.800) 0.000
Painfall Medal	ynthetic Rainfall Details	
FEH Rainfall Version	2013 Cv (Summer) 1.000	
Site Location GB	528304 184308 TQ 28304 84308 Cv (Winter) 1.000	
Margin for Flood Risk Warn Analysis	ning (mm) 300.0 DTS Status ON Inertia Status OFF Timestep Fine DVD Status OFF	
	Profile(s) Summer and Winter	
Dur	ation(s) (mins) 360	
Return Pe	riod(s) (years) 100	
	mate Change (%) 0	
US/MH US/CL PN Name Event (m)	Water Surcharged FloodedHalf DraLevel Depth Volume Flow / Overflow Maximum Time(m)(m³)Cap.(1/s)Vol (m³)	nin Pipe Flow (l/s) Status
S1.000 S1 360 minute 100 year Summer I+0% 50.000	0.064 -0.386 0.000 0.05 0.084	12.3 OK
S1.001 S2 360 minute 100 year Summer I+0% 49.000	-0.102 -0.356 0.000 0.10 0.177	12.3 OK
	©1982-2020 Innovyze	

Appendix B Greenfield Runoff Volume Calculations

Pell Frischmann			Page 1
5 Manchester Square			
London			
W1U 3PD			Micco
Date 16/01/2024 14:57	Designed by TSt	urtridge	
File Greenfield Runoff Volume.SRCX	Checked by		Diamage
Innovyze	Source Control	2020.1	L
Cro.	onfield Bunoff I	Volumo	
<u> </u>	enifiera kunori (<u>rorume</u>	
	FSR Data		
Return Pe	eriod (years)	100	
Storm Du:	ration (mins)	360	
	Region Engla	nd and Wales	
	M5-60 (mm)	20.600	
	Ratio R	0.437	
Areal Red	uction Factor	1.00	
	Area (ha)	0.080	
	SAAR (IIIII)	87 000	
	Urban	0,000	
	SPR	30.000	
	Results		
	Percentage Runoff	(%) 24.41	
Greenfi	eld Runoff Volume (m³) 12.092	
	01982-2020 Innov	W70	
	91902-2020 IIII0V	y 20	

Appendix C Existing Site Runoff Calculations

							Pa	ge 1
5 Manchester Square								
London								
W1U 3PD							N/	icro
Date 16/01/2024 14:48	Designe	d by	HMcCo	oll				
File B - Existing Runoff	Checked	by						allaye
Innovyze	Network	2020	.1					
STORM SEWER DESIGN	by the M	lodifi	ed R	atio	nal I	Metho	<u>od</u>	
Design	Criteria	a for	Stor	<u>rm</u>				
Pipe Sizes ST	ANDARD Man	hole S:	izes S	STANDA	RD			
н Н	EH Rainfal	1 Mode	1					
Return Per:	iod (years)						100	
FEH Rainfa	all Version						2013	
Sit	te Location	GB 52	28304 1	184308	3 TQ 2	28304	84308 Doint	
Maximum Rainfa	all (mm/hr)						50	
Maximum Time of Concentrat	tion (mins)						30	
Foul Sewag	ge (l/s/ha)						0.000	
Volumetric Run	noff Coeff.						1.000	
Add Flow / Climate	Change (%)						100	
Minimum Backdrop	Height (m)						0.200	
Maximum Backdrop	Height (m)						1.500	
Min Design Depth for Optim: Min Vel for Auto Design	isation (m)						1.200	
Min Slope for Optimisa	ation (1:X)						500	
			C C I .					
Design	ned with Le	evel So	offits					
Design 	ned with Le Design Ta	evel So	offits	torm				
Design <u>Network I</u> PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m	ned with Le Design Ta LE. Ba Lins) Flow	ble f se (1/s)	ffits For S k (mm)	torm HYD SECT	DIA (mm)	Secti	ion Type	e Auto Design
Design <u>Network I</u> PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000	ned with Le Design Ta C.E. Ba Lins) Flow 5.00 0.00	ble f se (1/s) 0.0 0.0	Eor <u>S</u> k (mm) 0.600 0.600	HYD SECT o	DIA (mm) 450 450	Secti Pipe/ Pipe/	i on Type /Conduit /Conduit	e Auto Design t î
Design <u>Network I</u> PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000 <u>Netw</u>	ned with Le Design Ta C.E. Ban Lins) Flow 5.00 0.00 Cork Resul	ble f se (1/s) 0.0 0.0 lts Ta	Eor <u>S</u> k (mm) 0.600 0.600 able	HYD SECT 0	DIA (mm) 450 450	Secti Pipe/ Pipe/	ion Type /Conduit /Conduit	e Auto Design t t
Design <u>Network I</u> PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000 <u>Netw</u> PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (r	ned with Le Design Ta C.E. Bas hins) Flow 5.00 0.00 Cork Resul Area Σ B ha) Flow	ble f se (1/s) 0.0 0.0 lts T. lase (1/s)	Eor S k (mm) 0.600 0.600 able Foul (1/s)	HYD SECT o o Add 1 (1/	DIA (mm) 450 450	Secti Pipe/ Pipe/ Vel (m/s)	Conduit Conduit Conduit Cap (1/s)	e Auto Design t t flow (1/s)
Design <u>Network I</u> PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000 <u>Netw</u> PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (h S1.000 50.00 5.07 0.000 (ned with Le Design Ta C.E. Ba Mins) Flow 5.00 0.00 Cork Resul Area Σ B ha) Flow 0.079	ble f se (1/s) 0.0 0.0 lts Te sase (1/s) 0.0	Eor S k (mm) 0.600 0.600 able Foul (1/s) 0.0	HYD SECT o o Add :	DIA (mm) 450 450 Flow 's) 0.0	Secti Pipe/ Pipe/ Vel (m/s) 2.66	Conduit Conduit Conduit Cap (1/s) 423.5	e Auto Design t f Flow (1/s) 14.3
Design Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. S1.000 50.00 5.07 0.000 (m S1.000 50.00 5.11 -0.196 (0	ned with Le Design Ta C.E. Ba Mins) Flow 5.00 0.00 Cork Resul Area Σ B ha) Flow 0.079 0.079	ble f ble f (1/s) 0.0 0.0 lts T. (1/s) 0.0 0.0	Eor S k (mm) 0.600 0.600 able Foul (1/s) 0.0 0.0	HYD SECT O Add I (1/	DIA (mm) 450 450 Flow (s) 0.0 0.0	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00	Conduit Conduit Conduit (2000 (1/s) 423.5 159.3	Auto Design t t f t f t f t f t f t f t f t f t f
Design Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m S1.000 11.458 0.196 58.5 0.079 S1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (fr S1.000 50.00 5.07 0.000 (c S1.001 50.00 5.07 0.000 (c Free Flowing Elowing Elowing	ned with Le Design Ta P.E. Bas dins) Flow 5.00 0.00 Cork Resul Area E B ha) Flow 0.079 0.079 0.079 0.079	ble f ble f (1/s) 0.0 0.0 lts To (1/s) 0.0 0.0 0.0 0.0 Detai	<pre>bffits Eor S k (mm) 0.600 0.600 able Foul (1/s) 0.0 0.0 .ls f</pre>	HYD SECT o Add : (1/	DIA (mm) 450 450 Flow (s) 0.0 0.0 0.0	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00	Conduit Conduit Conduit (Conduit (1/s) 423.5 159.3	Auto Design t t flow (1/s) 14.3 14.3
Design Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (free Single Control on Contro Contro Contro	ned with Le Design Ta C.E. Ba dins) Flow 5.00 0.00 Ork Resu Area E B ha) Flow 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079	ble f ble f (1/s) 0.0 0.0 1ts Tr (1/s) 0.0 0.0 0.0 Detai . Level	Eor S k (mm) 0.600 0.600 able Foul (1/s) 0.0 0.0 0.0 1 M:	HYD SECT o Add : (1/	DIA (mm) 450 450 Flow 's) 0.0 0.0 0.0 torm D,L	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00	Conduit Conduit Conduit (Conduit (Conduit (Conduit (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Conduit) (Cond	Flow (1/s) 14.3
Design Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (h \$1.000 50.00 5.07 0.000 0 \$1.001 50.00 5.11 -0.196 0 Free Flowing Outfall Outfall Pipe Name	ned with Le Design Ta C.E. Ba S.00 0.00 Pork Resul Area E B ha) Flow 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.	ble f ble f (1/s) 0.0 0.0 lts T. iase (1/s) 0.0 0.0 Detai (m)	effits Eor S k (mm) 0.600 0.600 able Foul (1/s) 0.0 0.0 0.0 1.1 1.1 (1	HYD SECT 0 Add 1 (1/ 0r S: in evel m)	DIA (mm) 450 450 Flow (s) 0.0 0.0 0.0 torm D,L (mm)	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00 W (mm)	Conduit Conduit Cap (1/s) 423.5 159.3	Flow (1/s) 14.3 14.3
Design Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (ft) \$1.000 50.00 5.07 0.000 0 \$1.001 50.00 5.11 -0.196 0 Free Flowing Outfall Outfall Single \$1.001 50.00 5.11 Single Single	ned with Le Design Ta C.E. Bas S.00 0.00 Cork Resul Area Σ B ha) Flow 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.007 0.007 0.007 0.007 0.007 0.007 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0079 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.0070 0.00700 0.0070 0.0070 0.0070 0.007	ble f ble f (1/s) 0.0 0.0 lts T. iase (1/s) 0.0 0.0 Detai . Level (m) -0.202	ffits imm 0.600 0.600 able Foul (1/s) 0.0 .1s I I.1 I.1 2 0	torm HYD SECT 0 0 Add 1 (1/ 0r S: in evel m)	DIA (mm) 450 450 Flow ('s) 0.0 0.0 0.0 torm D,L (mm) 0	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00 W (mm) 0	Conduit Conduit Cap (1/s) 423.5 159.3	Flow (1/s) 14.3 14.3
Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (fr \$1.000 50.00 5.07 0.000 0 \$1.001 50.00 5.11 -0.196 0 Eree Flowing Outfall Outfall Outfall Silond	ned with Le Design Ta P.E. Bas dins) Flow 5.00 0.00 Pork Resul Area E B ha) Flow 0.079 0.079 0.079 0.079 Outfall C. Level I (m) 48.000	ble f ble f (1/s) 0.0 0.0 1ts Tr (1/s) 0.0 0.0 0.0 Detai (m) -0.202	ffits Eor S k (mm) 0.600 able Foul (1/s) 0.0 0.1s f I I. I. (1/2) 2	torm HYD SECT 0 0 Add 1 (1/ 0r S: in evel m)	DIA (mm) 450 450 Flow 's) 0.0 0.0 torm D,L (mm) 0	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00 W (mm) 0	Conduit Conduit Cap (1/s) 423.5 159.3	Auto Design Flow (1/s) 14.3 14.3
Network I PN Length Fall Slope I.Area T (m) (m) (1:X) (ha) (m \$1.000 11.458 0.196 58.5 0.079 \$1.001 2.578 0.006 407.1 0.000 Netw PN Rain T.C. US/IL E I. (mm/hr) (mins) (m) (fr \$1.000 50.00 5.07 0.000 0 \$1.001 50.00 5.07 0.000 0 \$1.001 50.00 5.11 -0.196 0 Free Flowing Outfall Outfall Outfall S \$1.001 \$ \$ \$ \$ \$	ned with Le Design Ta 2.E. Ba 5.00 0.00 0.00 0.00 0.00 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.079 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0.007 0	ble f ble f (1/s) 0.0 0.0 1ts T. (1/s) 0.0 0.0 0.0 Detai (m) -0.202 Innov	fits Eor S k (mm) 0.600 able Foul (1/s) 0.0 .1s f I. M: I. I. yze	torm HYD SECT O Add 1 (1/ Or S: in .evel m)	DIA (mm) 450 450 Flow 's) 0.0 0.0 torm D,L (mm) 0	Secti Pipe/ Pipe/ Vel (m/s) 2.66 1.00 W (mm) 0	Conduit Conduit Cap (1/s) 423.5 159.3	Auto Design t Flow (1/s) 14.3 14.3

Pell Frischmann		Page 2	
5 Manchester Square			
London			
W1U 3PD		Micro	
Date 16/01/2024 14:48	Designed by HMcColl		
File B - Existing Runoff	Checked by	Digitiada	
Innovyze	Network 2020.1		
Simulatio	<u>on Criteria for Storm</u>		
Volumetric Runoff Coeff	1.000 Additional Flow - % of Total Fl	ow 0.000	
Areal Reduction Factor	1.000 MADD Factor * 10m ³ /ha Stora	ge 2.000	
Hot Start (mins)	U Inlet Coefficie	nt 0.800	
Manhole Headloss Coeff (Global)	0.500 Run Time (min	s) 60	
Foul Sewage per hectare (1/s)	0.000 Output Interval (min	.s) 1	
Number of Input Hydrogr	aphs 0 Number of Storage Structures 0		
Number of Offline Cont	rols 0 Number of Time/Area Diagrams 0		
	ions o Mander of Real line concrois o		
Synthet	<u>ic Rainfall Details</u>		
Drinfall Mad	۵] נה ט		
Rainian Mou Return Period (year	s) 100		
FEH Rainfall Versi	on 2013		
Site Locati	on GB 528304 184308 TQ 28304 84308		
Data Ty	pe Point		
Summer Stor	ms Yes		
Winter Stor	ms Yes		
CV (Summe	r) 1.000		
Storm Duration (mins) 30			

Pell Frisc	chmann								Page 3
5 Manchest	cer Squ	Jare							
London									
W1U 3PD									Micco
Date 16/01	L/2024	14:48		Desi	aned by	HMcColl			
File B - F	Existi	ng Runoff	-	Chec	ked bv				Drainage
Innovyze		<u> </u>		Netw	ork 202	0 1			
					0211 202				
<u>100 year</u>	Return	Period	Summary	of C:	ritical	Results	by Max	imum I	evel (Rank
			-	1) fo	r Storm	<u>ı</u>	-		
	A most	1 Doductio	<u>Si</u> n Eactor	<u>mulati</u>	on Criter	ria Tral Elore	° of ∏o	tol Ele	
	ALEC	Hot Star	t (mins)	000.1	MAI	DD Factor *	10m ³ /ha	Storag	e 2.000
	Ho	ot Start Le	vel (mm)	0		In	let Coef	fiecien	t 0.800
Manho	le Headl	oss Coeff	(Global)	0.500	Flow per	Person per	Day (l/	per/day) 0.000
Fou.	1 Sewage	e per hecta	re (1/s)	0.000					
	Num	ber of Inpu	ıt Hydrogi	aphs (Number	of Storage	Structu	res O	
	N	umber of Or	nline Cont	rols (Number	of Time/Are	ea Diagra	ams O	
	Nu	mber of Off	Eline Cont	rols (Number	of Real Tin	ne Contro	ols O	
			Synthe	etic Ra	ainfall D	<u>etails</u>			
		Rain	nfall Mode	el			FEI	ł	
		FEH Rainfa	all Versio	on an			2013	3	
		Sit	Data Tvr	on GB : De	28304 18	4308 TQ 283	304 84308 Point	3 -	
		(Cv (Summer	r)			1.000)	
		(Cv (Winter	r)			1.000)	
	Maa	rain for Fl	ood Piek	Warnin	r (mm) 30	זעם 0.0	D Status	OFF	
	Mai	.gin ior fi	Analv	sis Tir	nestep F	ine Inerti	a Status	OFF	
			-	DTS :	Status	ON			
				Profil	.e(s) Sum	mer and Wir	nter		
			Duration	n(s) (n	uins)		360		
		Retu	rn Period	(s) (ye	ears)		100		
			CIIMate	change	: (~)		0		
	o / MT	7-					Dimet (P)	Water
PN N	S/MH Name	Storm Pe	eriod Cha	nate Fi nge Si	rst (X) rcharge	First (1) I Flood	First (Z Overflow) Overi 7 Act	. (m)
				.					
S1.000	S1 36	0 Summer	100	+0% +0%					0.064
31.001	52 50	Juniner	100	+0%					-0.102
		Surcharged	Flooded		Overfler	Half Drain	n Pipe		Lovel
PN	Name	(m)	(m ³)	Cap.	(1/s)	(mins)	(1/s)	Status	Exceeded
				••••					
S1.000	S1	-0.386	0.000	0.05			12.3	OK	
51.001	52	-0.330	0.000	0.10			12.3	Un	
			©198	32-201	20 Inno	vvze			
			0100	0		1 = 2			

Appendix D Greenfield Runoff Rate Calculation



Henry McColl

Calculated by:

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Mar 12 2024 14:45

Site Details

Site name:	Saville Theatre	Latitude:	51.51183° N		
Site location:	Camden	Longitude:	0.12977° W		
This is an estimatio criteria in line with l	l n of the greenfield runoff rates that a Environment Agency guidance "Rainfa	are used to meet normal best practice Reference: Il runoff management for	2081362878		

developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation	approach	IH124				
Site characteristi	cs		Notes			
Total site area (ha): 0.08			(1) Is $\Omega_{\text{MD}} < 2.0 \text{J/s/ha}$?			
Methodology						
Q _{BAR} estimation method:			When Q _{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.			
SPR estimation method:	Calculate from S	SOIL type				
Soil characteristic	Default	Edited	(2) Are flow rates < 5.0 l/s?			
SOIL type:	2	2	Where flow rates are less than 5.01/2 concept			
HOST class:	N/A	N/A	for discharge is usually set at 5.0 l/s if blockage			
SPR/SPRHOST:	0.3	0.3	from vegetation and other materials is possible. Lower consent flow rates may be set where the			
Hydrological characteristics _{Default} _{Edite}		Edited	blockage risk is addressed by using appropriate drainage elements.			
SAAR (mm):	611	611				
Hydrological region:	6	6	(3) Is SPR/SPRHOST ≤ 0.3?			
Growth curve factor 1 year	0.85	0.85	Where groundwater levels are low enough the			
Growth curve factor 30 years:	2.3	2.3	use of soakaways to avoid discharge offsite			
Growth curve factor 100 years:	3.19	3.19	surface water runoff.			
Growth curve factor 200 years:	3.74	3.74				

Q _{BAR} (I/s):	0.12	0.12	
1 in 1 year (l/s):	0.11	0.11	
1 in 30 years (l/s):	0.29	0.29	
1 in 100 year (l/s):	0.4	0.4	
1 in 200 years (l/s):	0.47	0.47	

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix E Drainage Strategy



Drainage Strategy Notes Existing Runoff Rate Given the nature of development, (i.e. demolition of an existing structure and reuse of the same footprint), a runoff rate for the existing building has been calculated as follows Given the absence of a comprehensive survey of the drainage infrastructure serving the existing development, an estimation on existing runoff has been made under the assumption that there is no restriction on runoff leaving the site. Existing building footprint - 791m² Volumetric runoff coefficient - 1 Return Period - 100 years Approx. offsite flow rate for the 15 minute, 100 year return period Identified potential open area - 550m² event - 58.7l/s Greenfield Runoff Rate As proposed within Camden Borough Councils drainage advice/Proforma document; '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. Based on the above, an assessment of the greenfield rate has been undertaken using the Interim Code of Practice for SuDS (the modified IH124 method). A general rate of 1.56l/s/ha has been calculated for the areas giving the site a calculated greenfield runoff of **0.12l/s**. If the runoff from the site is required to be restricted to this value for all events up to the 100 year + 40% CC - approximately **118m**³ storage is required. Under the current architectural layout of the roof, it is unfeasible to deliver this quantum of storage at roof level. Due to the nature of the development (i.e. the application area is the building footprint, there are no external areas to place storage) an assessment of the minimum discharge rate has been undertaken henceforth. Minimum discharge rate assessment Approximately 550m² of open area within the roof footprint has been identified on this plan as areas of possible Blue Roof. An 80% Utility of this area has been taken for conservatism, giving a design area of 440m² At 100mm depth (1 unit) and an assumed 95% Void ratio, an approximate volume of **42m³** can be provided at roof level. If this is provided, an offsite discharge rate of approximately **7I/s** is required for all events up to the 100 year + 40% CC a 51.7I/s (or 88%) betterment on the existing runoff. These high level assessments require reassessment by a Blue Roof specialist - until reassessed these are indicative only. KEY: IDENTIFIED BLUE ROOF AREA (550m²) INDICATIVE GREEN ROOF (108m²) 9 - 22/.76 °-{()NK

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 DRN
 CHK
 APP
 DAT
 Updated to new footprint Updated to new assessed footprint Initial Issue DESCRIPTION

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Architect/Client/Contractor YC Saville Theatre Ltd.

Saville Theatre, Shaftesbury Avenue

Drawing Title Indicative Drainage Assessment

Drawing Stat	Drawing Status						
PRELIMINARY							
	Name	Date	Status Code				
Drawn	H. McCOLL	22.11.23	<u> S2</u>				
Designed	H. McCOLL	22.11.23	1:100				
Eng Chk	D. ALLUM-ROONEY	22.11.23	Revision				
Approved	D. ALLUM-ROONEY	22.11.23	P03				
Drawing No.							
105465 - PEF - ZZ - XX - DR - CD - 0500							