Appendix E Sustainable Drainage Report



# SAVILLE THEATRE 135 SHAFTESBURY AVENUE

SUSTAINABLE URBAN DRAINAGE 105465-PEF-ZZ-XX-DR-CD-000001-S2-P04\_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 part-demolition, part-retention, refurbishment and extension of the existing building at 135-149 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 YC Saville Theatre Limited to develop a sustainable drainage strategy to support an outline 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 800m<sup>2</sup> 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.



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.



Figure 2-3 Extract of Local Thames Water Sewer Network

#### **Existing runoff rate**

- 2.3.4 The existing runoff rate has been assessed using a notional network model to calculate the peak runoff 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**.
- 2.3.6 The 100 year + 40% Climate Change event peak runoff rate of 81.3l/s can be conveyed by a 300mm 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**

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

**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 12.1m<sup>3</sup>. The calculations for this event can be seen in **Appendix B**.
- 2.3.9 The runoff volume for the existing site for 360-minute, 100-year return period event calculated at 70m<sup>3</sup>. Calculations for this can be seen in **Appendix C**.

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 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 It is recommended that a survey is commissioned to better understand the existing drainage connections from the cinema into the public network.

#### 3.3 Runoff rate control

- 3.3.1 It is proposed that, because there are no external areas or possible locations for attenuation within the development, that there is no opportunity for runoff rate control within the drainage network serving the site.
- 3.3.2 Due to the continuity of an overall impermeable area, it is considered that the peak runoff rate and volume will not be altered and thus there will be no overall impact on the public sewerage network.

#### 3.4 Impermeable areas

3.4.1 The building footprint is approximately 800m<sup>2</sup>, representing no net change to existing conditions.

#### 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.

### 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.

Торіс	Existing Site		Proposed Development
Site Area (m <sup>2</sup> )	800		800
Impermeable Area (m <sup>2</sup> )	800		800
Number of Sub- Catchments	1		1
Outfall Location(s)	Combined Sewer	Network	Combined Sewer Network
	1 in 2-year	16.8	
	1 in 30-year	43.9	As Existing
Peak Runoff Rate (I/s)	1 in 100-year	81.3	
Proposed Storage Volume (m <sup>3</sup> )	-		-
SuDS Features	-		Improvement on planning submission strategy to be developed
Maintenance Responsibilities	Landowner		Landowner

Appendix A Existing Runoff Rate 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	
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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         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 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         5.11         -0.196         0           Eree         Flowing         Outfall         Outfall         Figure           \$1.001         \$1.001         \$1.001         \$1.001         \$1.001         \$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	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	<b>Auto</b> Design t <b>Flow</b> (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 <sup>3</sup> /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	
	1015 6 Number of Real line concrois 6	
Synthet	<u>ic Rainfall Details</u>	
Drinfall Mad	۵] <del>נה</del> 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 (min	s) 30	

Pell Frischmann		Page 3
5 Manchester Square		
London		
W1U 3PD		Micro
Date 16/01/2024 14:48	Designed by HMcColl	
File B - Existing Runoff	Checked by	Dialitage
Innovyze	Network 2020.1	
<u>100 year Return Period Summ</u> Areal Reduction Fac	<u>ary of Critical Results by Maxim</u> <u>1) for Storm</u> <u>Simulation Criteria</u> tor 1.000 Additional Flow - % of Tota:	<u>um Level (Rank</u> 1 Flow 0.000
Hot Start (mi Hot Start Level ( Manhole Headloss Coeff (Glob Foul Sewage per hectare (1 Number of Input Hy Number of Online Number of Offline	ns) 0 MADD Factor * 10m <sup>3</sup> /ha St mm) 0 Inlet Coeffic al) 0.500 Flow per Person per Day (l/per /s) 0.000 drographs 0 Number of Storage Structures Controls 0 Number of Time/Area Diagrams Controls 0 Number of Real Time Controls	corage 2.000 ecient 0.800 r/day) 0.000
S Rainfall FEH Rainfall V Site Lo Dat CV (S	vnthetic Rainfall DetailsModelFEHersion2013cation GB 528304 184308 TQ 28304 84308a TypePointummer)1.000	
Cv (W	inter) 1.000	
Margin for Flood F P Dur Return Pe Cli	<pre>isk Warning (mm) 300.0 DVD Status 02 nalysis Timestep Fine Inertia Status 02 DTS Status ON Profile(s) Summer and Winter ation(s) (mins) 360 riod(s) (years) 100 mate Change (%) 0</pre>	FF FF
US/MH Return PN Name Storm Period S1.000 S1 360 Summer 100	Climate First (X) First (Y) First (Z) ( Change Surcharge Flood Overflow	Water Dverflow Level Act. (m) 0.064
51.001 52 500 Summer 100	T U %	-0.102
Surcharged Flood US/MH Depth Volu PN Name (m) (m³	ded Half Drain Pipe me Flow / Overflow Time Flow ) Cap. (l/s) (mins) (l/s) Sta	Level atus Exceeded
S1.000 S1 -0.386 0.	000 0.05 12.3	OK
	©1982-2020 Innovyze	

Appendix B Greenfield Runoff Volume Calculations

5 Manchester Square			
London			
W1U 3PD			Micco
Date 16/01/2024 14:57	Designed by TStu	rtridge	
File Greenfield Runoff Volume.SRCX	Checked by		Diamaye
Innovyze	Source Control 20	020.1	
		_	
Gree	<u>enfield Runoff Vo</u>	lume	
	FSR Data		
Return Pe	eriod (vears)	100	
Storm Dur	ration (mins)	360	
	Region England	d and Wales	
	M5-60 (mm)	20.600	
	Ratio R	0.437	
Areal Redu	uction Factor	1.00	
	Area (ha)	0.080	
	SAAR (mm)	600 87 000	
	Urban	0.000	
	SPR	30.000	
	Results		
	Percentage Runoff (%	8) 24.41	
Greenfie	eld Runoff Volume (m³	3) 12.092	
(C)	01982-2020 Innovyz	ze	

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> <b>k</b> (mm) 0.600 0.600	HYD SECT o	<b>DIA</b> (mm) 450 450	Secti Pipe/ Pipe/	i <b>on Type</b> /Conduit /Conduit	e Auto Design t <del>î</del>
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 ble f (1/s) 0.0 0.0 lts Ta	Eor <u>S</u> k (mm) 0.600 0.600 able	HYD SECT 0	<b>DIA</b> (mm) 450 450	Secti Pipe/ Pipe/	<b>ion Type</b> /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. (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 <b>Cap</b> (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 Tage (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 T T T T T T T T T T T T T T T T T
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	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>ffits for 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)         (ff           \$1.000         50.00         5.07         0.000         0           \$1.001         50.00         5.11         -0.196         0           Free Flowing         Outfall         Outfall         Outfall         Outfall	ned with Le Design Ta C.E. Ba dins) Flow 5.00 0.00 Ork Resu Area E B ha) Flow 0.079 0.070 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 Mm	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) (Cond	<b>Flow</b> (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 Number         Name	ned with Le Design Ta C.E. Ba S.00 0.00 Pork Resul Area E B ha) Flow 0.079 0.	ble f ble f (1/s) 0.0 0.0 lts T. iase (1/s) 0.0 0.0 Detai (m)	ffits         Eor S         k         (mm)         0.600         able         Foul         (1/s)         0.0         .1s f         I. M:         I. I.         (1/s)	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	<b>Flow</b> (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 0.007 0.007 0.007 0.007 0.007 0.007 0.0079 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	<b>Flow</b> (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           Free Flowing           Outfall Outfall           Pipe Number         Name           \$1.001         \$         \$	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         5.11         -0.196         0           Eree         Flowing         Outfall         Outfall         Siling           \$1.001         \$1.001         \$1.001         \$1.001         \$1.001         \$1.001	ned with Le Design Ta 2.E. Ba 5.00 0.00 0.00 0.00 0.00 0.079 0.0000 0.00000 0.00000 0.00000 0.0000 0.0000000 0.0000 0.0	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	<b>Auto</b> Design t <b>Flow</b> (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			
Simulation Criteria for Storm				
Volumetric Runoff Coeff	1.000 Additional Flow - % of Total Fl	ow 0.000		
Areal Reduction Factor	1.000 MADD Factor * 10m <sup>3</sup> /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			
	1015 6 Number of Real line concrois 6			
Synthetic Rainfall Details				
Drinfall Mad	۵] <del>נה</del> ט			
Rainian Mou Return Period (year	s) 100			
FEH Rainfall Version 2013				
Site Location GB 528304 184308 TQ 28304 84308				
Data Type Point				
Summer Stor	ms Yes			
Winter Stor	ms Yes			
CV (Summe	r) $1.000$			
Storm Duration (min	s) 30			

Pell Frischmann		Page 3	
5 Manchester Square			
London			
W1U 3PD		Micco	
Date 16/01/2024 14:48	Designed by HMcColl		
File B - Existing Runoff	Checked by	Diamaye	
Innovyze	Network 2020.1		
<u>100 year Return Period Summary</u> Si Areal Reduction Factor	of Critical Results by Maximum I <u>1) for Storm</u> <u>mulation Criteria</u> 1.000 Additional Flow - % of Total Flo	Level (Rank	
Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Foul Sewage per hectare (l/s) Number of Input Hydrogu Number of Online Cont Number of Offline Cont	0 MADD Factor * 10m <sup>3</sup> /ha Storag 0 Inlet Coefficcien 0.500 Flow per Person per Day (1/per/day 0.000 raphs 0 Number of Storage Structures 0 crols 0 Number of Time/Area Diagrams 0 crols 0 Number of Real Time Controls 0	re 2.000 at 0.800 7) 0.000	
<u>Synth</u> Rainfall Mode FEH Rainfall Versie Site Locatie Data Typ Cv (Summe Cv (Winte	etic Rainfall Details         el       FEH         on       2013         on GB 528304 184308 TQ 28304 84308         pe       Point         r)       1.000         r)       1.000		
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON Profile(s) Summer and Winter Duration(s) (mins) 360 Return Period(s) (years) 100 Climate Charge (%) 0			
US/MH Return Clin PN Name Storm Period Cha S1.000 S1 360 Summer 100	mate First (X) First (Y) First (Z) Overf nge Surcharge Flood Overflow Act +0%	Water Elow Level (m) 0.064	
S1.001 S2 360 Summer 100	+0%	-0.102	
Surcharged Flooded US/MH Depth Volume PN Name (m) (m³)	Half Drain Pipe Flow / Overflow Time Flow Cap. (l/s) (mins) (l/s) Status	Level Exceeded	
S1.000 S1 -0.386 0.000 S1.001 S2 -0.356 0.000	0.05 12.3 OK 0.10 12.3 OK		
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