

Drainage Calculations

B06275 - Stoke Park SANG



B06275-CLK-XX-CA-C-001 P02

Eastleigh Borough Council

Project: B06275-Stoke Park SANG	Date: 26/07/2023			clarkebond
	Designed by: Nicholas Weyer	Checked by:	Approved By:	
B06275-CLK-XX-CA-C-001 P02	Company Address: 129 Cumberland Road Bristol BS1 6UY			
Report Details: Type: Junctions Storm Phase: Phase				

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
Flow Control Chamber	Manhole	447655.569	120211.745	25.400	0.850	24.550	Circular	0.600
Outfall	Manhole	447651.590	120221.038	24.500	0.850	23.650	Circular	0.600
Manhole 4 (French Drain)	Manhole	447655.255	120201.459	25.297	0.847	24.450	Circular	0.600
Connection Manhole	Manhole	447654.245	120212.064	25.400	1.200	24.200	Circular	0.600
Manhole 1 (French Drain)	Manhole	447743.616	120163.682	28.788	0.788	28.000	Circular	0.450
Manhole 2 (French Drain)	Manhole	447714.551	120186.834	27.659	1.034	26.625	Circular	0.600
Manhole 3 (French Drain)	Manhole	447689.645	120184.686	27.725	1.625	26.100	Circular	0.600

Name	Lock
Flow Control Chamber	All
Outfall	All
Manhole 4 (French Drain)	All
Connection Manhole	All
Manhole 1 (French Drain)	All
Manhole 2 (French Drain)	All
Manhole 3 (French Drain)	All

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Flow Control Chamber	Pond Outlet	Pipe 2.000	(None)	No Restriction
Outfall	Inlet flow Control	Pipe 1.004	(None)	No Restriction
Manhole 4 (French Drain)	Inlet	Pipe 1.002	(None)	No Restriction
Connection Manhole	Inlet	Pipe 1.003 Pipe 2.001	(None)	No Restriction
Manhole 1 (French Drain)	Inlet	Manhole 1 (Catchment Area)	(None)	No Restriction
Manhole 2 (French Drain)	Inlet	Manhole 2 (Catchment Area) Pipe 1.000	(None)	No Restriction
Manhole 3 (French Drain)	Inlet	Pipe 1.001	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Flow Control Chamber	Outlet	Pipe 2.001	Orifice
	Diameter (m)	0.041	
	Coefficient of Discharge	0.500	
	Invert Level (m)	24.550	
Manhole 4 (French Drain)	Outlet	Pipe 1.003	Free Discharge
Connection Manhole	Outlet	Pipe 1.004	Free Discharge
Manhole 1 (French Drain)	Outlet	Pipe 1.000	Free Discharge
Manhole 2 (French Drain)	Outlet	Pipe 1.001	Free Discharge
Manhole 3 (French Drain)	Outlet	Pipe 1.002	Free Discharge

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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: 129 Cumberland Road Bristol BS1 6UY			



Pond

Type : Pond

Dimensions

Exceedance Level (m)	25.400
Depth (m)	0.800
Base Level (m)	24.600
Freeboard (mm)	350
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	4.475
Total Volume (m³)	35.114

Depth (m)	Area (m²)	Volume (m³)
0.000	50.00	0.000
0.050	55.00	2.624
0.100	61.00	5.523
0.150	67.00	8.722
0.200	73.00	12.220
0.250	81.00	16.069
0.300	88.00	20.293
0.350	95.00	24.866
0.400	102.00	29.790
0.450	111.00	35.114
0.500	120.00	40.887
0.550	130.00	47.136
0.600	140.00	53.884
0.650	150.00	61.133
0.700	160.00	68.881
0.750	170.00	77.130
0.800	180.00	85.879

Inlets

Parking Catchment

Inlet Type	Point Inflow
Incoming Item(s)	Parking Area
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe 2.000
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	13.067
Friction Scheme	Manning's n
n	0.035

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B06275-CLK-XX-CA-C-001 P02		Designed by: Nicholas Weyer	Checked by:		Approved By:
Report Details: Type: Connections Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Curved	Upstream Cover Level (m)
Pipe 1.004	9.359	Pipe	17.015		0.6	225	☐	25.400
Pipe 1.003	10.653	Pipe	42.613		0.6	225	☐	25.297
Pipe 2.001	1.361	Pipe	3.889		0.6	225	☐	25.400
Pipe 2.000	6.517	Pipe	130.342		0.6	225	☐	25.400
Pipe 1.001	25.581	Pipe	48.725		0.6	225	☒	27.659
Pipe 1.002	38.263	Pipe	23.190		0.6	225	☐	27.725
Pipe 1.000	38.123	Pipe	29.326		0.6	150	☐	28.788

Name	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)
Pipe 1.004	24.200	24.500	23.650	All	
Pipe 1.003	24.450	25.400	24.200	All	
Pipe 2.001	24.550	25.400	24.200	All	2.0
Pipe 2.000	24.600	25.400	24.550	All	2.0
Pipe 1.001	26.625	27.725	26.100	All	
Pipe 1.002	26.100	25.297	24.450	All	
Pipe 1.000	28.000	27.659	26.700	All	

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B06275-CLK-XX-CA-C-001 P02		Designed by: Nicholas Weyer	Checked by:		Approved By:
Report Details: Type: Network Design Report Storm Phase: Phase Flow Path: 1.000 French Drain - Flow Path		Company Address: 129 Cumberland Road Bristol BS1 6UY			

Name	Time Of Travel (mins)	Rainfall Intensity (mm/hr)	Total Area (ha)	Total Impermeable Area (ha)	Total Base Flow (L/s)	Proportional Depth (mm)	Proportional Velocity (m/s)	Full Bore Velocity (m/s)
Pipe 1.000	5.34	146.870	0.180	0.063		98	2.050	1.866
Pipe 1.001	5.57	144.681	0.381	0.133		139	2.027	1.879
Pipe 1.002	5.80	142.515	0.381	0.133		110	2.703	2.729
Pipe 1.003	5.89	141.718	0.381	0.133		133	2.138	2.010
Branch: Pipe 2.000								
Pipe 2.000	5.09	149.338			2.0	32	0.577	1.144
Pipe 2.001	5.10	149.303			2.0	14	1.982	6.682
Pipe 1.004	5.94	141.282	0.381	0.133	2.0	101	3.049	3.188

Name	Capacity (L/s)	Flow (L/s)
Pipe 1.000	32.9778	25.1215
Pipe 1.001	74.6911	52.1895
Pipe 1.002	108.4975	52.1895
Pipe 1.003	79.9032	52.1895
Branch: Pipe 2.000		
Pipe 2.000	45.4724	2.0000
Pipe 2.001	265.6917	2.0000
Pipe 1.004	126.7481	52.9633

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B06275-CLK-XX-CA-C-001 P02	Designed by: Nicholas Weyer	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address: 129 Cumberland Road Bristol BS1 6UY			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR

Type: FSR

Region	England And Wales
M5-60 (mm)	19.8
Ratio R	0.350
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	45.000
30.0	0.000
1.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

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B06275-CLK-XX-CA-C-001 P02	Designed by: Nicholas Weyer	Checked by:	Approved By:	
Report Title: UK and Ireland Rural Runoff Calculator	Company Address: 129 Cumberland Road Bristol BS1 6UY			

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.075
SAAR (mm)	800.0
Soil	0.47
Region	Region 7
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 7	0.4	0.4	0.4	1.0	1.4

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Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Flow Control Chamber	FSR: 100 years: +45 %: 120 mins: Winter	25.400	24.550	25.050	0.500	2.0	0.141	0.000	2.0	23.420	Surcharged
Outfall	FSR: 100 years: +45 %: 15 mins: Winter	24.500	23.650	23.776	0.126	76.4	0.000	0.000	76.5	42.727	OK
Manhole 4 (French Drain)	FSR: 100 years: +45 %: 15 mins: Winter	25.297	24.450	24.667	0.217	76.3	0.061	0.000	75.3	40.534	OK
Connection Manhole	FSR: 100 years: +45 %: 15 mins: Winter	25.400	24.200	24.348	0.148	76.6	0.042	0.000	76.4	42.727	OK
Manhole 1 (French Drain)	FSR: 100 years: +45 %: 15 mins: Winter	28.788	28.000	28.280	0.280	38.7	0.045	0.000	32.5	17.955	Surcharged
Manhole 2 (French Drain)	FSR: 100 years: +45 %: 15 mins: Winter	27.659	26.625	26.961	0.336	81.5	0.095	0.000	74.9	40.575	Surcharged
Manhole 3 (French Drain)	FSR: 100 years: +45 %: 15 mins: Winter	27.725	26.100	26.240	0.140	74.9	0.040	0.000	76.3	40.560	OK

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Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Flow Control Chamber	FSR: 30 years: +0 %: 120 mins: Winter	25.400	24.550	24.852	0.302	1.6	0.085	0.000	1.6	17.205	Surcharged
Outfall	FSR: 30 years: +0 %: 15 mins: Winter	24.500	23.650	23.740	0.090	43.2	0.000	0.000	43.4	23.231	OK
Manhole 4 (French Drain)	FSR: 30 years: +0 %: 15 mins: Winter	25.297	24.450	24.582	0.132	44.0	0.037	0.000	42.6	21.550	OK
Connection Manhole	FSR: 30 years: +0 %: 15 mins: Winter	25.400	24.200	24.301	0.101	43.7	0.029	0.000	43.2	23.231	OK
Manhole 1 (French Drain)	FSR: 30 years: +0 %: 15 mins: Winter	28.788	28.000	28.087	0.087	20.6	0.014	0.000	19.7	9.514	OK
Manhole 2 (French Drain)	FSR: 30 years: +0 %: 15 mins: Winter	27.659	26.625	26.764	0.139	45.8	0.039	0.000	45.1	21.582	OK
Manhole 3 (French Drain)	FSR: 30 years: +0 %: 15 mins: Winter	27.725	26.100	26.200	0.100	45.1	0.028	0.000	44.0	21.573	OK

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FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Flow Control Chamber	FSR: 1 years: +0 %: 120 mins: Winter	25.400	24.550	24.703	0.153	1.1	0.043	0.000	1.1	9.834	OK
Outfall	FSR: 1 years: +0 %: 15 mins: Winter	24.500	23.650	23.707	0.057	17.6	0.000	0.000	17.6	9.907	OK
Manhole 4 (French Drain)	FSR: 1 years: +0 %: 15 mins: Winter	25.297	24.450	24.527	0.077	17.7	0.022	0.000	17.1	8.781	OK
Connection Manhole	FSR: 1 years: +0 %: 15 mins: Winter	25.400	24.200	24.260	0.060	17.8	0.017	0.000	17.6	9.907	OK
Manhole 1 (French Drain)	FSR: 1 years: +0 %: 15 mins: Winter	28.788	28.000	28.051	0.051	8.4	0.008	0.000	8.0	3.879	OK
Manhole 2 (French Drain)	FSR: 1 years: +0 %: 15 mins: Winter	27.659	26.625	26.706	0.081	18.6	0.023	0.000	18.3	8.799	OK
Manhole 3 (French Drain)	FSR: 1 years: +0 %: 15 mins: Winter	27.725	26.100	26.161	0.061	18.3	0.017	0.000	17.7	8.795	OK

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Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Outflow

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond	FSR: 100 years: +45 %: 15 mins: Winter	24.894	24.894	0.294	0.294	46.3	19.752	0.000	0.000	2.0	2.626	43.749	OK

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FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Outflow

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond	FSR: 30 years: +0 %: 120 mins: Winter	24.852	24.852	0.252	0.252	8.2	16.244	0.000	0.000	1.6	17.399	53.740	OK

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Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Outflow

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond	FSR: 1 years: +0 %: 120 mins: Winter	24.703	24.703	0.103	0.103	3.5	5.731	0.000	0.000	1.1	9.854	83.679	OK

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Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 129 Cumberland Road Bristol BS1 6UY			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe 1.004	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Connection Manhole	Outfall	25.400	24.348	0.137	42.727	3.0	0.6	76.4	OK
Pipe 1.003	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Manhole 4 (French Drain)	Connection Manhole	25.297	24.667	0.182	40.534	2.2	0.94	75.3	OK
Pipe 2.001	FSR: 100 years: +45 %: 120 mins: Winter	Pipe	Flow Control Chamber	Connection Manhole	25.400	25.050	0.047	23.404	1.5	0.01	2.0	Surcharged
Pipe 2.000	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Pond	Flow Control Chamber	25.400	24.894	0.225	2.626	0.4	0.04	2.0	Surcharged
Pipe 1.001	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	Manhole 2 (French Drain)	Manhole 3 (French Drain)	27.659	26.904	0.209	36.193	2.0	1.03	77.0	Surcharged
Pipe 1.002	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Manhole 3 (French Drain)	Manhole 4 (French Drain)	27.725	26.240	0.178	40.560	2.3	0.7	76.3	OK
Pipe 1.000	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	Manhole 1 (French Drain)	Manhole 2 (French Drain)	28.788	28.193	0.150	15.962	1.8	0.99	32.6	Surcharged

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FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe 1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Connection Manhole	Outfall	25.400	24.301	0.096	23.231	2.7	0.34	43.2	OK
Pipe 1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Manhole 4 (French Drain)	Connection Manhole	25.297	24.582	0.117	21.550	2.0	0.53	42.6	OK
Pipe 2.001	FSR: 30 years: +0 %: 120 mins: Winter	Pipe	Flow Control Chamber	Connection Manhole	25.400	24.852	0.035	17.192	1.3	0.01	1.6	Surcharged
Pipe 2.000	FSR: 30 years: +0 %: 120 mins: Winter	Pipe	Pond	Flow Control Chamber	25.400	24.852	0.225	17.399	0.2	0.03	1.6	Surcharged
Pipe 1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Manhole 2 (French Drain)	Manhole 3 (French Drain)	27.659	26.764	0.119	21.582	2.1	0.6	45.1	OK
Pipe 1.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Manhole 3 (French Drain)	Manhole 4 (French Drain)	27.725	26.200	0.116	21.573	2.1	0.41	44.0	OK
Pipe 1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Manhole 1 (French Drain)	Manhole 2 (French Drain)	28.788	28.087	0.085	9.514	1.9	0.6	19.7	OK

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FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe 1.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Connection Manhole	Outfall	25.400	24.260	0.058	9.907	2.1	0.14	17.6	OK
Pipe 1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole 4 (French Drain)	Connection Manhole	25.297	24.527	0.069	8.781	1.7	0.21	17.1	OK
Pipe 2.001	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	Flow Control Chamber	Connection Manhole	25.400	24.703	0.024	9.829	1.2	0	1.1	OK
Pipe 2.000	FSR: 1 years: +0 %: 120 mins: Winter	Pipe	Pond	Flow Control Chamber	25.400	24.703	0.128	9.854	0.2	0.02	1.1	OK
Pipe 1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole 2 (French Drain)	Manhole 3 (French Drain)	27.659	26.706	0.071	8.799	1.7	0.24	18.3	OK
Pipe 1.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole 3 (French Drain)	Manhole 4 (French Drain)	27.725	26.161	0.069	8.795	1.7	0.16	17.7	OK
Pipe 1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole 1 (French Drain)	Manhole 2 (French Drain)	28.788	28.051	0.051	3.879	1.5	0.24	8.0	OK



clarkebond

Engineering outstanding solutions for community and place

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