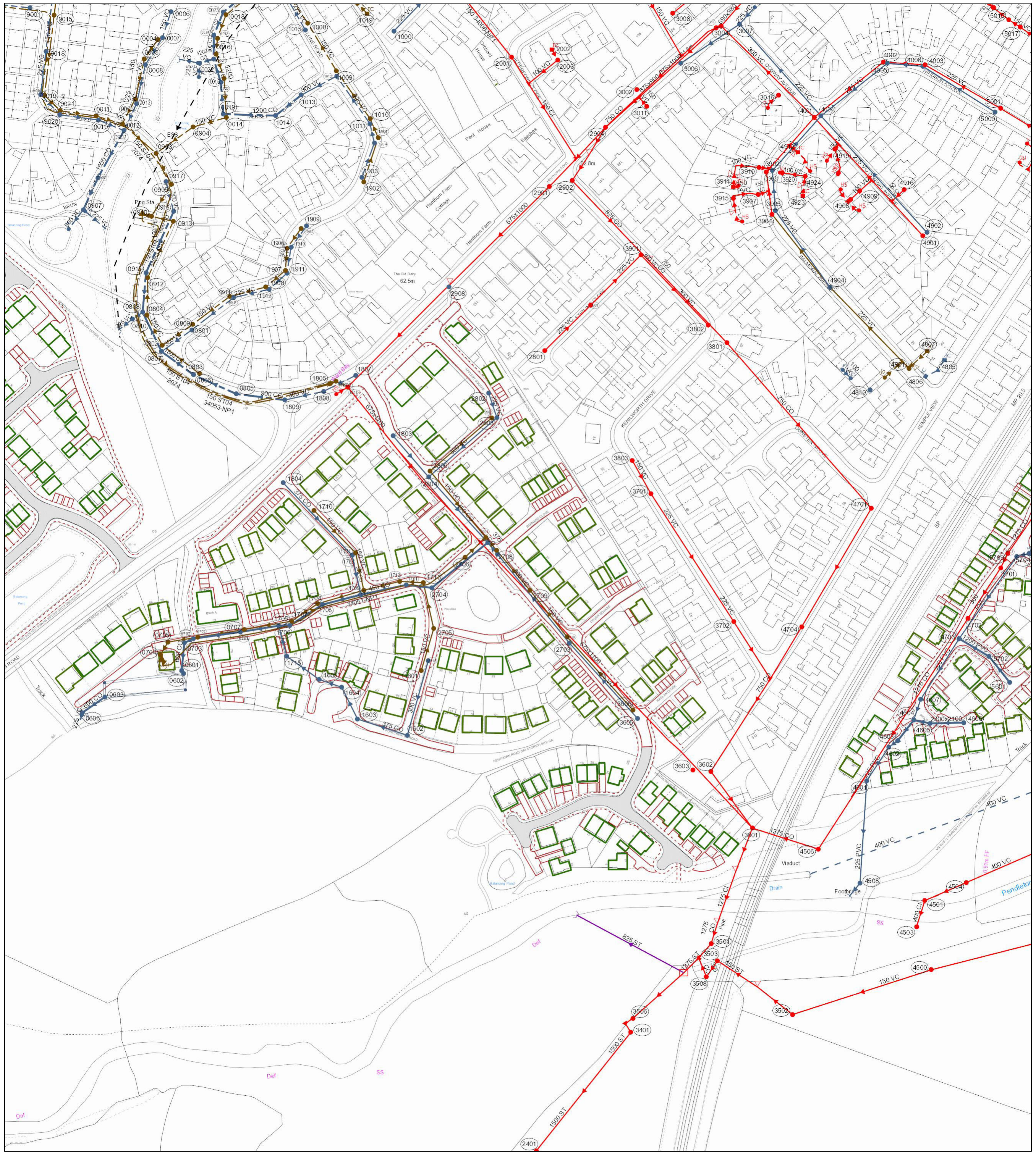


The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3915		CO		150			PVC	15.62271	
3010		CO		150			VC	6.575601	
0801	60.7	FO	58.44	150			VC	20.6093	1 in 33
4501		CO		400			CI	15.22362	
0004	60.22	FO	58.54	150			VC	13.28283	1 in 63
4004	61.96	SW	61.01	225			VC	68.01182	1 in 252
0916	60.41	SW	57.04	1500			CO	37.27437	1 in 414
4003	62.9	CO	60.97	225			VC	23.14331	1 in 129
1911	61.68	SW	60.21	225			VC	13.29146	1 in 46
3601	60.07	CO	57.48	1275			CO	26.18972	
0015	60.41	FO	58.48	150			VC	21.73617	1 in 14
0911	61.28	FO	59.09	150			VC	25.69642	1 in 40
2903	63.12	CO	61.53	225			VC	39.39293	1 in 96
3007	61.6	SW	60.72	225			VC	39.27575	
9021	61.68	FO	57.29	150			VC	20.05609	1 in 154
9021	61.68	FO	57.29	150			VC	20.05609	1 in 154
4903	62.31	SW	61.57	225			VC	52.04873	1 in 473
1906	60.37	FO	59.28	225			VC	7.271699	1 in 9
1908	61.67	FO	59.6	150			VC	20.56142	1 in 40
0010	60.86	SW	58.97	300			VC	15.45284	1 in 19
0010	60.86	SW	58.97	300			VC	15.45284	1 in 19
1903	62.57	SW	61.09	225			VC	20.24806	1 in 81
1912	61.66	SW	59.92	225			VC	20.34279	1 in 40
1013	61.39	SW	57.65	1050			CO	18.18846	1 in 455
5015		CO		150			VC	10.40012	
1910	62.16	SW	60.54	225			VC	14.63675	1 in 44
0808	60.61	FO	58.61	150			VC	20.60048	1 in 46
1905	62.39	FO	60.6	150			VC	13.50861	1 in 40
0903	60.35	SW	55.76	150			VC	19.1691	1 in 147
0913	60.34	FO	56.32	150			VC	12.44115	1 in 156
0904	60.36	FO	56.81	150			VC	25.19814	1 in 148
0012	60.89	FO	57.06	150			VC	24.80297	1 in 20
0012	60.89	FO	57.06	150			VC	24.80297	1 in 20
3602	62.86	CO	57.86	750			CO	38.97091	1 in 20
4904	62.3	CO	61.16	225			VC	51.60632	1 in 143
0808	59.89	SW	56.89	225			VC	6.894129	1 in 172
0905	60.5	FO	55.66	150			VC	20.99955	1 in 162
1009	61.74	FO	59.83	150			VC	30.85552	1 in 91
0805	60.25	SW	57.07	1500			CO	25.92525	1 in 432
0915	60.08	SW	56.95	1500			CO	21.97668	1 in 366
3801	62.05	CO	58.54	750			CO	121.9892	1 in 642
2904	62.35	CO	58.89	675			CO	18.21659	
9018	61.5	SW	59.38	225			VC	24.04749	1 in 141
9018	61.5	SW	59.38	225			VC	24.04749	1 in 141
3004	61.6	CO	59.05	675			CO	2.871794	
5017		CO		150			VC	7.644009	
0807	60.01	SW	56.96	1500			CO	24.20189	1 in 346
3901	62.86	CO	61.07	300			VC	53.80049	1 in 256
3506	59.47	CO	0	1500			ST	10.78391	
3506	59.47	CO	0	1500			ST	10.78391	
2001		CO		150			CI	66.86023	
4916		CO		150			VC	9.681772	
3907		CO		150			VC	6.297554	
4005	62.34	SW	61.31	225			VC	46.82106	1 in 161
0803	60.2	FO	58.39	150			VC	25.90848	1 in 45
9016	61.81	FO	57.37	150			VC	12.20837	1 in 153
9016	61.81	FO	57.37	150			VC	12.20837	1 in 153
3508	59.01	CO	57.99	375			CO	11.38339	
3508	59.01	CO	57.99	375			CO	11.38339	
0021	60.5	SW	57.45	1200			CO	8.117025	1 in 406
3701	63.04	CO	60.65	225			VC	84.46891	1 in 156
9015	61.26	FO	57.67	150			VC	44.82964	1 in 149
9015	61.26	FO	57.67	150			VC	44.82964	1 in 149
2003		CO		100			VC	20.91656	
0810	59	SW	58.85	225			VC	9.656144	1 in 5
3803	62.89	CO	61.19	150			VC	21.06928	1 in 43
0902	60.22	SW	57.41	1050			CO	29.8747	1 in 373
0902	60.22	SW	57.41	1050			CO	29.8747	1 in 373
4500	63.4	CO	62.1	150			VC	80.82523	1 in 29
4500	63.4	CO	62.1	150			VC	80.82523	1 in 29
3702	62.69	CO	60.1	225			VC	37.7432	
2904	62.35	CO	58.89	675			CO	45.22867	1 in 323
3401	58.35	CO	0	1500			ST	84.02314	
3401	58.35	CO	0	1500			ST	84.02314	
3503	59.46	CO	58.31	150			ST	10.81762	1 in 155
3503	59.46	CO	58.31	150			ST	10.81762	1 in 155
9001	61.38	SW	59.78	225			VC	32.87987	1 in 137
9001	61.38	SW	59.78	225			VC	32.87987	1 in 137
0007	60.23	SW	58.8	150			VC	17.74611	1 in 99
0011	61.23	FO	57.16	150			VC	15.12951	1 in 151
0011	61.23	FO	57.16	150			VC	15.12951	1 in 151
1008	61.34	FO	59.49	150			VC	32.25455	1 in 154
0917	60.5	SW	58.31	300			VC	17.02012	1 in 243
1801	60.19	CO	58.39	675			CO	113.4128	1 in 129
0006	60.38	SW	58.95	150			VC	15.14497	1 in 101
9020	61.8	SW	59.06	300			VC	21.42251	1 in 238
9020	61.8	SW	59.06	300			VC	21.42251	1 in 238
0022	60.5	SW		0			VC	0.9290474	
2401		CO	0	1500			ST	62.37337	
2401		CO	0	1500			ST	62.37337	
4801		FO		225			VC	62.95552	
0906	60.1	SW	57.18	1200			CO	19.47749	1 in 390
0906	60.1	SW	57.18	1200			CO	19.47749	1 in 390
0914	61.32	SW	59.41	225			VC	29.17198	1 in 40
1807	60.61	SW	59.03	300			VC	19.81302	1 in 42
0017	60.5	FO	58.63	150			VC	8.756287	1 in 146
1000	61.47	SW	59.48	225			VC	40.82109	1 in 83
0018	60.69	FO	58.73	150			VC	13.81168	1 in 138
3003	61.62	CO	59.07	750			CO	82.75062	1 in 517
3008		CO		100			VC	40.8348	
2901	62.88	CO	58.75	675			CO	77.42996	1 in 455
1901	62.27	FO	60.36	150			VC	11.49951	1 in 164
1012	61.77	SW	60.22	300			VC	22.23997	1 in 67
1909	62.41	SW	60.9	225			VC	14.5768	1 in 40
5016		CO		150			VC	3.581457	
1907	61.93	FO	59.96	150			VC	14.26909	1 in 40
0804	59.88	FO	57.69	150			VC	20.85351	1 in 139
4704	62.52	CO	0	750			CO	94.55505	
1011	62.18	SW	60.7	225			VC	32.28437	1 in 81
0009	60.11	SW	58.39	225			VC	16.48362	1 in 103
1902	62.61	FO	60.79	150			VC	25.77011	1 in 60
0016	60.5	FO	58.57	150			VC	14.18241	1 in 158
4504		CO		400			VC	25.11004	
1809	59.89	SW	57.74	900			CO	27.098	1 in 387
1906	62.12	FO	60.26	150			VC	12.30585	1 in 41
0005	60.09	FO	58.33	150			VC	22.59299	1 in 56
1805	60.28	FO	59.28	225			VC	3.897025	1 in 195
5001	64.62	CO	63.1	225			VC	48.42111	1 in 23
1010	62.14	FO	60.29	150			VC	32.37262	1 in 79
2801	63.2	CO	61.9	225			VC	35.7164	1 in 99
9019	61.81	SW	59.13	300			VC	15.53543	1 in 222
9019	61.81	SW	59.13	300			VC	15.53543	1 in 222
5000	64.54	SW	63.07	225			VC	47.26346	1 in 29
1015	61.37	SW	59.83	225			VC	21.37457	1 in 82
3003	61.62	CO	59.07	675			CO	40.32613	1 in 504
4701	62.81	CO	58.34	750			CO	76.29437	
0907	59.96	SW		0			VC	1.335126	
0907	59.96	SW		0			VC	1.335126	
0024	60.5	SW	57.79	900			CO	12.97224	1 in 324
0023	60.66	SW	58.12	600			CO	14.10144	1 in 470
0912	60.06	FO	57.54	150			VC	34.38727	1 in 156
2902	62.95	CO	58.91	825			CO	62.4174	1 in 367
3502	60.39	CO	59.34	150			VC	24.64996	1 in 137
3502	60.39	CO	59.34	150			VC	24.64996	1 in 137
4902	63.22	SW	61.71	225			VC	87.27325	1 in 132
0008	60.02	SW	58.55	225			VC	22.11215	1 in 138
0013	60.13	FO	57.93	150			VC	15.59166	1 in 37
1808	60.19	SW	58.49	300			VC	22.00919	1 in 147
1904	62.32	SW	60.84	225			VC	10.95817	1 in 78
0802	59.97	FO	57.81	150			VC	18.743	1 in 156
4006	62.88	SW	61.39	225			VC	19.9276	1 in 498
0806	69.19	SW	57.01	1500			CO	21.96757	1 in 439
0014	60.75	FO	56.94	150			VC	19.1859	1 in 148
0020	60.32	SW	57.49	1200			VC	13.68621	1 in 342
1014	61.19	SW	57.61	1200			CO	28.98625	1 in 362
0019	60.68	SW	57.53	1200			CO	17.56688	1 in 439
4506	59.83	CO	57.85	1275			CO	38.40807	1 in 89
5701	65.13	CO	61.87	1275			CO	33.29248	
4702		CO		1275			CO	152.572	
0705	55.82	FO	53.1	150			VC	8.165299	1 in 63
2702	61.15	SW	57.82	375			CO	8.4303	1 in 12
3605	62.97	SW	61.29	225			VC	56.30801	1 in 73
2803	61.41	SW	59.55	300			VC	50.19079	1 in 72
1715	57.17	SW	54.69	375			CO	17.51766	1 in 584
1601	59.29	FO	57.93	150			VC	24.2017	1 in 78
2704	59.91	SW	56.94	450			CO	14.2892	1 in 179
1803	60.88	SW	59.15	300			VC	30.19521	1 in 67
3606	63.06	FO	60.61	150			VC	54.52776	1 in 80
1603	57.16	SW	55.02	375			CO	19.66085	1 in 164
2710	62.17	FO	59.93	150			VC	33.11968	1 in 118
1701	59.53	SW	56.86	450			CO	25.72361	1 in 24
2804	60.9	SW	58.7	450			CO	48.95032	1 in 39
1710	58.17	FO	56.07	150			VC	32.88432	1 in 71
1604	57.56	SW	54.9	375			CO	13.26604	1 in 147
1705	57.32	SW	55.07	450			CO	6.232221	1 in 10
1703	58.48	SW	56.08	375			CO	22.39066	1 in 83
1713	59.88	FO	56.63	150			VC	13.04251	1 in 29
2706	60.72	FO	59.25	150			VC	11.92671	
2802	61.55	SW	59.86	225			VC	14.40935	1 in 63
1702	58.76	SW	55.81	450			CO	21.97157	1 in 61
2712	59.58	SW	57.92	300			VC	42.94785	1 in 33
0706	56.04	FO	53.23	150			VC	16.55684	1 in 127
1712	59.45	FO	56.18	150			VC	20.60982	1 in 29
2708	61.16	FO	59.42	150			VC	9.217617	1 in 84
1707	57.4	FO	54.68	150			VC	26.60756	1 in 34
1709	58.84	FO	55.46	150			VC	26.76113	1 in 70
1711	58.49	FO	55.61	150			VC	21.25716	1 in 142
0707	56.47	FO	53.9	150			VC	26.31459	1 in 39
2703	62.17	SW	60.45	300			VC	63.4098	1 in 85
1708	58.01	FO	55.08	150			VC	17.20378	1 in 43
0704	55.78	FO		150			VC	2.67649	
1605	57.18	SW	54.81	375			CO	22.09701	1 in 184
2705	59.82	FO	57.62	150			VC	26.07846	1 in 26
2709	61.16	FO	59.65	150			VC	28.88203	1 in 126
2805	61.41	FO	60.09	150			VC	45.23265	1 in 119
2806	60.85	FO	59.71	150			VC	48.17875	1 in 120
2701	61.06	SW	57.15	450			CO	39.83157	1 in 102
1804	57.97	SW	56.65	375			CO	55.51592	1 in 97
1602	58.2	SW	56.56	375			CO	29.03501	1 in 19
1704	58.1	SW	55.45	450			CO	21.45226	1 in 56
2707	61.07	FO	59.31	150			VC	4.040796	
0907	59.96	SW	58.6	300			VC	13.50706	1 in 225
0907	59.96	SW	58.6	300			VC	13.50706	1 in 225
0910	60.3	FO	56.24	150			VC	5.105917	
0703	56.02	SW	53.39	600			CO	15.41224	1 in 514
0606	55.61	SW	55.61	0			VC	0.3374262	
0606	55.61	SW	55.61	0			VC	0.3374262	
0701	56.43	SW	54.19	600			CO	26.31242	1 in 34
0601	56.4	SW	53.36	600			CO	2.000499	1 in 200
0702	56	SW	53.41	600			CO	5.548552	1 in 277
0603	56.89	SW	53.29	600			CO	15.16423	1 in 89

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
1706	57.12	SW	54.33	600			CO	21.4541	1 in 153
3501	59.32	CO	0	1275			ST	22.01725	
3501	59.32	CO	0	1275			ST	22.01725	
4002	62.27	CO	60.75	225			VC	49.09169	1 in 114
4001	61.9	CO	60.28	300			VC	72.25523	1 in 127
4919		CO		150			VC	3.478193	
3902	61.73	SW	61.14	225			VC	40.56606	1 in 369
3903	61.8	CO	60.24	225			VC	40.21582	1 in 335
3905	61.96	SW	61.3	225			VC	22.32107	1 in 159
3920		CO		100			VC	1.232167	
4924		CO		100			VC	12.72479	
3904	61.92	CO	60.75	225			VC	23.70228	1 in 82
4901	63.19	CO	61.71	225			VC	89.08815	1 in 64
3910		CO		100			VC	5.778832	
0602	56.99	SW		0			UN	44.12584	
0602	56.99	SW		0			UN	9.174504	
4601	62.71	SW	58.62	225			PVC	56.96326	1 in 25
5702	64.68	SW	61.53	1200			PVC	19.30085	1 in 386
4508	57.49	SW	56.34	225			PVC	9.59101	1 in 60
4604	63.49	SW	58.98	2400			CC	14.50065	1 in 363
4606	63.73	SW	59.05	2400			CC	18.74253	1 in 375
5709	65.35	CO	61.88	1275			CO	8.907385	1 in 891
5703	65.47	SW	63.27	300			PVC	55.71355	1 in 61
5601	65.01	SW	61.58	1200			PVC	18.44799	1 in 369
4603	63.23	SW		0			UN	0.3978535	
4602	63.27	SW	58.87	225			PVC	22.26288	1 in 89
4703	64.59	SW		0			UN	0.4242727	
4605	63.45	SW	59	2400			CC	9.172218	1 in 5
5704	65.66	SW		0			UN	0.3579538	
4607	63.84	SW	61.18	300			PVC	12.06088	1 in 30

LEGEND

Abandoned | Foul | Surface Water | Combined

Public Sewer
Private Sewer
Section 104
Rising Main
Sludge Main
Overflow
Water Course
Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

Manhole
Head of System
Extent of Survey
Rodding Eye
Inlet
Discharge Point
Vortex
Penstock
Washout Chamber
Valve
Air Valve
Non Return Valve
Soakaway
Gully
Cascade
Flow Meter
Hatch Box
Oil Interceptor
Summit
Drop Shaft
Orifice Plate

Side Entry Manhole
Outfall
Screen Chamber
Inspection Chamber
Bifurcation Chamber
Lamp Hole
T Junction / Saddle
Catchpit
Valve Chamber
Vent Column
Vortex Chamber
Penstock Chamber
Network Storage Tank
Sewer Overflow
Ww Treatment Works
Ww Pumping Station
Septic Tank
Control Kiosk
DNM Network Monitoring Point
Change of Characteristic

MANHOLE FUNCTION

FO Foul
SW Surface Water
CO Combined
OV Overflow

SEWER SHAPE

CI Circular | TR Trapezoidal
EG Egg | AR Arch
OV Oval | BA Barrel
FT Flat Top | HO HorseShoe
RE Rectangular | UN Unspecified
SQ Square

SEWER MATERIAL

AC Asbestos Cement
BR Brick
PE Polyethylene
RP Reinforced Plastic Matrix
CO Concrete
CSB Concrete Segment Bolted
CSU Concrete Segment Unbolted
CC Concrete Box Culverted
PSC Plastic / Steel Composite
GRC Glass Reinforced Plastic
DI Ductile Iron
PVC Polyvinyl Chloride
CI Cast Iron
SI Spun Iron
ST Steel
VC Vitrified Clay
PP Polypropylene
PF Pitch Fibre
MAC Masonry, Coursed
MAR Masonry, Random
U Unspecified

Address or Site Reference:

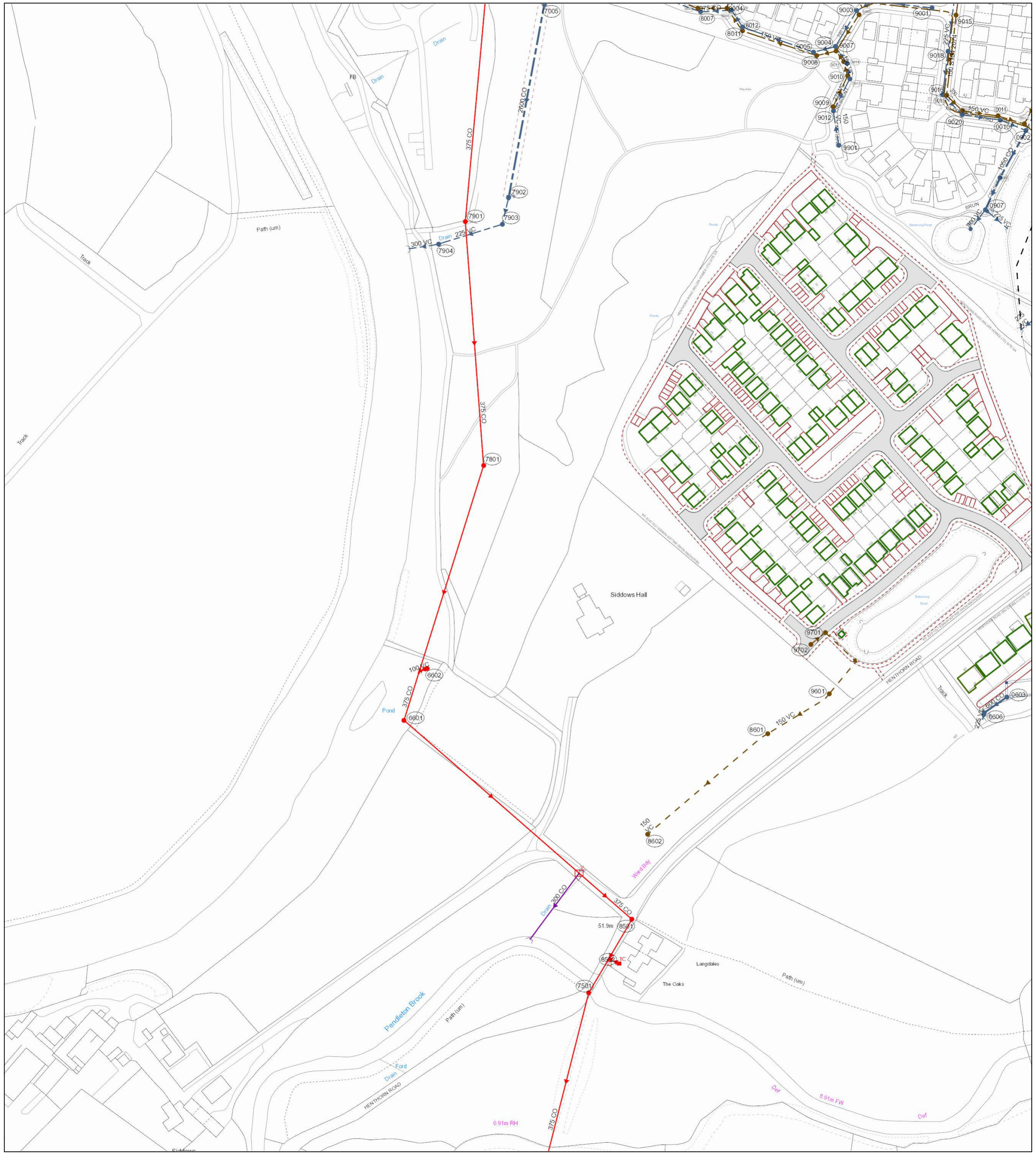
4 FAIRFIELD CLOSE,
CLITHEROE,
BB7 2PL

OS sheet Number: SD7340NW
Scale: 1:1250 Date: 26/11/2024
Nodes: 231
Sheet: 1 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0012	60.89	FO	57.06	150			VC	24.80297	1 in 20
0012	60.89	FO	57.06	150			VC	24.80297	1 in 20
0810	59	SW	58.85	225			VC	9.656144	1 in 5
0009	60.11	SW	58.39	225			VC	16.48362	1 in 103
9901	63.5	SW	61.85	150			VC	19.2775	1 in 60
9010	62.99	FO	60.79	150			VC	8.209078	1 in 59
6602		CO		100			VC	4.527486	
9005	53.14	SW	59.23	300			VC	41.61493	1 in 219
9014	62.9	SW	61.25	225			VC	11.24718	1 in 141
0902	60.22	SW	57.41	1050			CO	29.8747	1 in 373
0902	60.22	SW	57.41	1050			CO	29.8747	1 in 373
8009	62.6	FO	59.27	150			VC	42.06607	1 in 33
8007	62.76	SW	58.84	375			CO	42.38425	1 in 78
8012	63.7	FO	59.48	150			VC	15.24062	1 in 152
9018	61.5	SW	59.38	225			VC	24.04749	1 in 141
9018	61.5	SW	59.38	225			VC	24.04749	1 in 141
7501	51.21	CO	0	375			CO	102.0257	
7501	51.21	CO	0	375			CO	102.0257	
9013	63	SW	61.31	225			VC	8.748576	1 in 146
9001	61.38	SW	59.78	225			VC	32.87987	1 in 137
9001	61.38	SW	59.78	225			VC	32.87987	1 in 137
8004	63.36	FO	59.38	150			VC	16.21925	1 in 147
9004	62.86	SW	59.29	300			VC	12.54385	1 in 209
0011	61.23	FO	57.16	150			VC	15.12951	1 in 151
0011	61.23	FO	57.16	150			VC	15.12951	1 in 151
7903	56.71	SW	51.13	225			VC	36.99731	1 in 13
9019	61.81	SW	59.13	300			VC	15.53543	1 in 222
9019	61.81	SW	59.13	300			VC	15.53543	1 in 222
9021	61.68	FO	57.29	150			VC	20.05609	1 in 154
9021	61.68	FO	57.29	150			VC	20.05609	1 in 154
9020	61.8	SW	59.06	300			VC	21.42251	1 in 238
9020	61.8	SW	59.06	300			VC	21.42251	1 in 238
7902	57.1	SW	51.24	225			VC	0.479781	1 in 4
0906	60.1	SW	57.18	1200			CO	19.47749	1 in 390
0906	60.1	SW	57.18	1200			CO	19.47749	1 in 390
9003	62.31	SW	59.39	300			VC	23.2319	1 in 211
7801	53.1	CO	51.65	375			CO	148.0315	1 in 344
0907	59.96	SW		0			VC	1.335126	
0907	59.96	SW		0			VC	1.335126	
9009	63.22	FO	61.1	150			VC	18.73198	1 in 60
9012	63.27	SW	61.45	225			VC	20.05861	1 in 143
0010	60.86	SW	58.97	300			VC	15.45284	1 in 19
0010	60.86	SW	58.97	300			VC	15.45284	1 in 19
8006	63.41	SW	58.92	375			CO	17.15369	1 in 214
7904	49.69	SW	48.27	300			VC	16.63996	1 in 119
7005	56.68	SW	51.51	2600			CO	108.8873	1 in 403
7901	52.85	CO	52.09	375			CO	135.6296	1 in 323
9007	62.83	FO	59.84	150			VC	11.12105	1 in 159
0013	60.13	FO	57.93	150			VC	15.59166	1 in 37
9016	61.81	FO	57.37	150			VC	12.20837	1 in 153
9016	61.81	FO	57.37	150			VC	12.20837	1 in 153
9006	62.34	FO	60	150			VC	23.83252	1 in 149
9011	62.89	FO	60.65	150			VC	7.233996	1 in 9
9015	61.26	FO	57.67	150			VC	44.82964	1 in 149
9015	61.26	FO	57.67	150			VC	44.82964	1 in 149
9008	63.09	FO	59.77	150			VC	43.25613	1 in 149
8501	51.88	CO	50.69	375			CO	47.29444	1 in 42
8501	51.88	CO	50.69	375			CO	47.29444	1 in 42
8011	63.69	SW	59.04	300			VC	11.17755	1 in 224
0606	55.61	SW	55.61	0			VC	0.3374262	
0606	55.61	SW	55.61	0			VC	0.3374262	
9601		FO		150			VC	40.91178	
6601	53.86	CO		375			CO	128.9159	
0603	56.89	SW	53.29	600			CO	15.16423	1 in 89
0603	56.89	SW	53.29	600			CO	15.16423	1 in 89
0602	56.99	SW		0			UN	44.12584	
8601		FO		150			VC	86.83867	
9701		FO		150			VC	46.5886	
0907	59.96	SW	58.6	300			VC	13.50706	1 in 225
0907	59.96	SW	58.6	300			VC	13.50706	1 in 225
9702		FO		150			VC	10.37474	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined, blue - surface water
brown - foul, purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

4 FAIRFIELD CLOSE,
CLITHEROE,
BB7 2PL

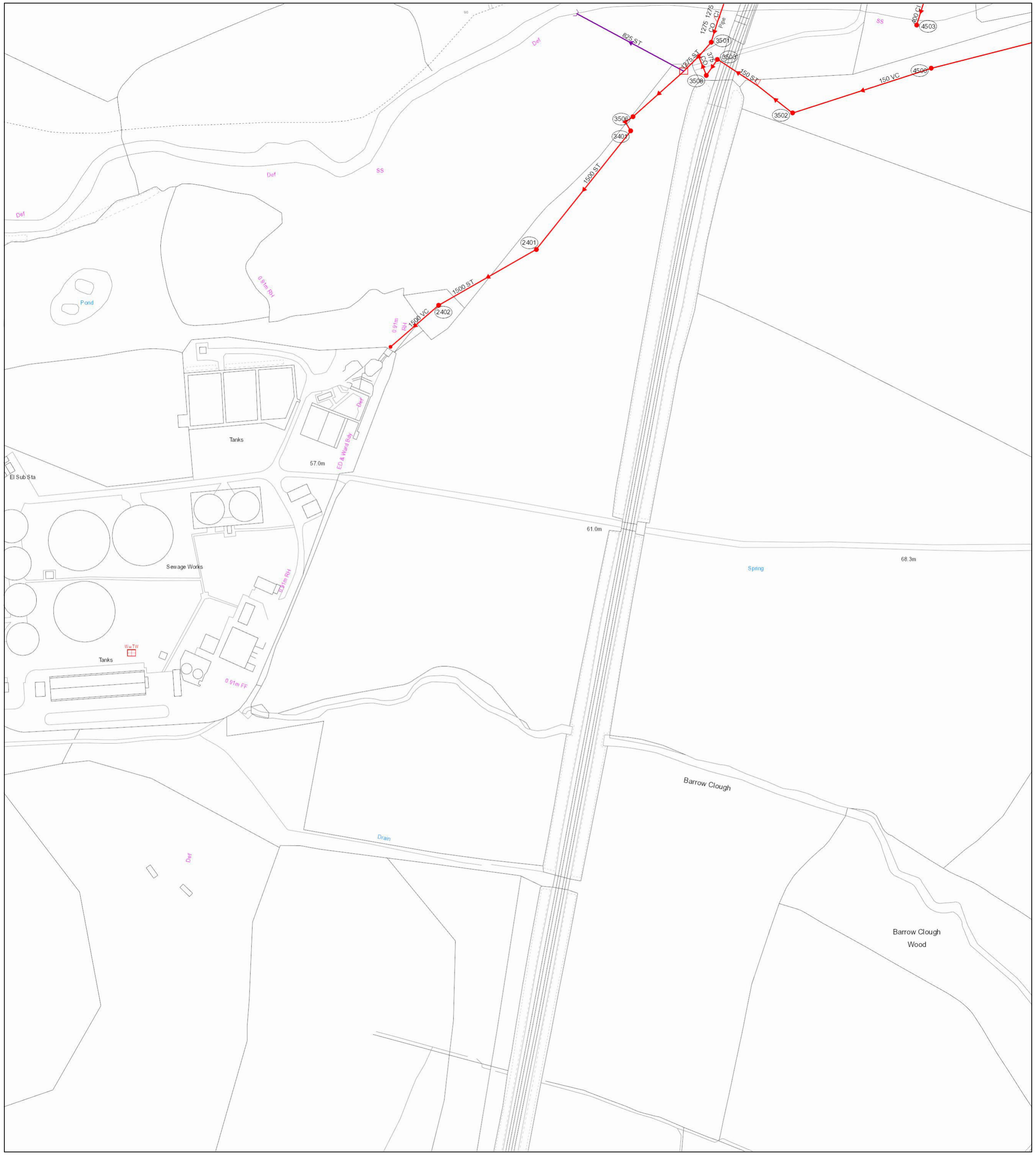
OS sheet Number: SD7240NE
Scale: 1:1250 **Date:** 26/11/2024
Nodes: 71
Sheet: 2 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.



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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3401	58.35	CO	0	1500			ST	84.02314	
3401	58.35	CO	0	1500			ST	84.02314	
3503	59.46	CO	58.31	150			ST	10.81762	1 in 155
3503	59.46	CO	58.31	150			ST	10.81762	1 in 155
4500	63.4	CO	62.1	150			VC	80.82523	1 in 29
4500	63.4	CO	62.1	150			VC	80.82523	1 in 29
3508	59.01	CO	57.99	375			CO	11.38339	
3508	59.01	CO	57.99	375			CO	11.38339	
4501		CO		400			CI	15.22382	
3506	59.47	CO	0	1500			ST	10.78391	
3506	59.47	CO	0	1500			ST	10.78391	
3502	60.39	CO	59.34	150			VC	24.64996	1 in 137
3502	60.39	CO	59.34	150			VC	24.64996	1 in 137
2401		CO	0	1500			ST	62.37337	
2401		CO	0	1500			ST	62.37337	
3501	59.32	CO	0	1275			ST	22.01725	
3501	59.32	CO	0	1275			ST	22.01725	
2402		CO		1500			VC	35.36223	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
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DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

4 FAIRFIELD CLOSE,
CLITHEROE,
BB7 2PL

OS sheet Number: SD7340SW
Scale: 1:1250 **Date:** 26/11/2024
Nodes: 18
Sheet: 3 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
7304		CO		300			UN	1.762012	
7401	52.37	CO	50.21	375			CO	90.73164	
7401	52.37	CO	50.21	375			CO	2.360416	
7501	51.21	CO	0	375			CO	102.0257	
7501	51.21	CO	0	375			CO	102.0257	
8501	51.88	CO	50.69	375			CO	47.29444	1 in 42
8501	51.88	CO	50.69	375			CO	47.29444	1 in 42
7401	52.37	CO		375			CO	2.135847	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate

- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

4 FAIRFIELD CLOSE,
CLITHEROE,
BB7 2PL

OS sheet Number: SD7240SE
Scale: 1:1250 **Date:** 26/11/2024
Nodes: 8
Sheet: 4 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

WASTEWATER PRE-DEVELOPMENT ENQUIRY

United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

31.01.2025

Dear **Edward**

Pre-Development Enquiry for Land off Henthorn Road Clitheroe Lancashire BB7 2SN

UU Reference Number: **06944548**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk Please see the image on **page 3** for details

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

Please see **comment 2** of the attached guidance sheet

Asset Protection

1. We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of the proposed development.

Please see **comment 3** of the attached guidance sheet and **Working Near Our Pipelines Guidance document**

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the East of your proposed development at an unrestricted rate.

Manhole reference SD72406601, **Grid reference** 372685, 440671

WASTEWATER PRE-DEVELOPMENT ENQUIRY

United Utilities
Water for the North West

Please see the images on **page 3** for clarification

Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

Please see comment **4** within the guidance sheet

Infiltration

Please see comment **4** within the guidance sheet

Waterbody

If an evidence-based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the **River Ribble** located to the East of the proposed site.

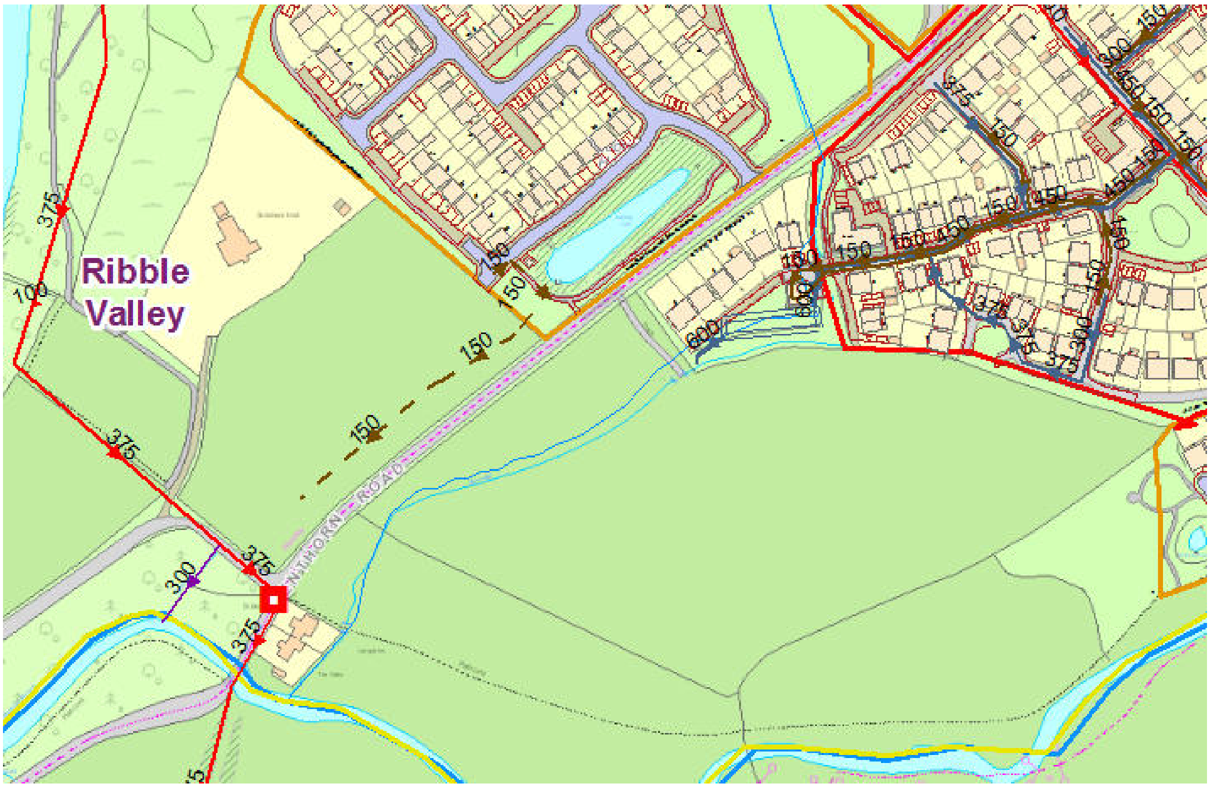
We would encourage you to engage with any third-party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Public Sewer

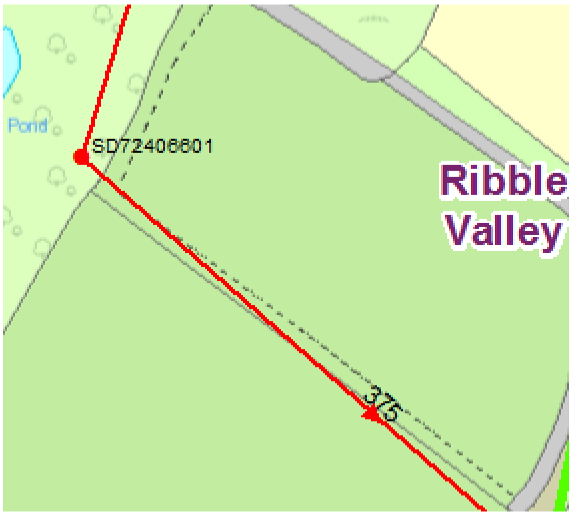
No connection to the public sewer will be permitted as this time due to the proposed connection to the watercourse.

Please see images on **page 3** for clarification

Site Images



Foul Point of Connection



Appendix 5 - Soakaway Testing

enzygo environmental consultants

Samuel House, 5 Fox Valley Way
Stocksbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

Dean Fisher
Gladman Developments
Gladman House
Alexandria Way
Congleton
Cheshire
CW12 1LB

Our Ref: SHF.1132.159.HY.LR.01
Date: 20th July 2018

Sent via email (D.Fisher@gladman.co.uk)

Dear Dean,

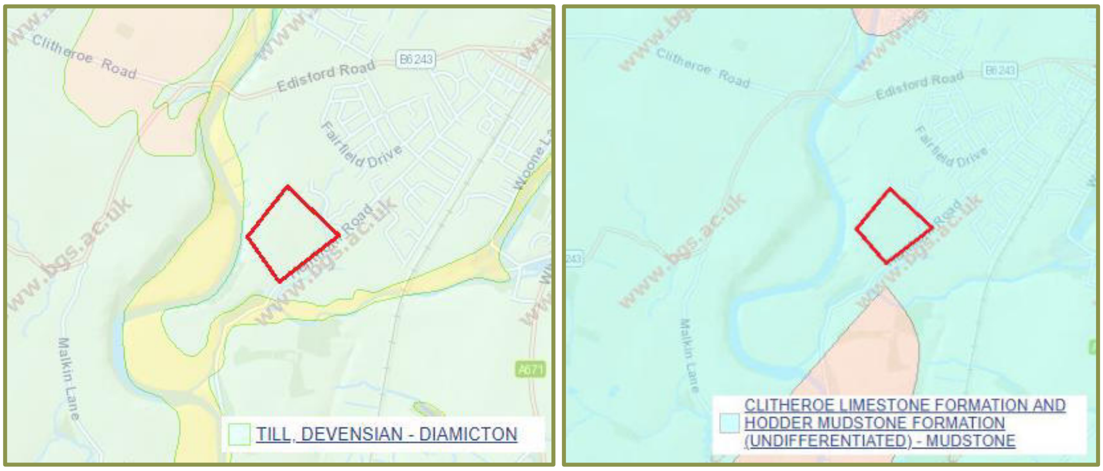
HENTHORN ROAD, CLITHEROE – SOAKAWAY TESTING

Following your request, we are pleased to report on the results of soakaway tests, which were undertaken on 11th and 12th July 2018.

Anticipated Geology

British Geological Survey (BGS) mapping (Figure 1) indicates the site is underlain by Clitheroe Limestone Formation and Hodder Mudstone Formation (undifferentiated), with clay-dominant Devensian Till (diamicton) superficial deposits.

Figure 1: Geology Mapping



***Left**: Superficial deposits. **Right**: Bedrock.* Contains British Geological Survey materials © NERC [2018]

environmental consultants

Samuel House, 5 Fox Valley Way
Stocksbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

Fieldwork and Ground Conditions

Fieldwork was undertaken on 11th and 12th July 2018 and comprised the construction of 3 No. soakaway pits and carrying out soakaway tests using them. The soakaway pits were excavated using a '2 foot' (600mm wide) excavator bucket at the locations shown in Figure 2. Locations were constrained to specific areas of the site due to underground and overhead utility services including 2 sets of overhead power lines running from West to East through the middle of the Site and North-West to South-East through the Western corner of the Site as well as an underground power line running along the South-Western boundary.

The excavated pits and arisings are shown on the accompanying photographs. The ground conditions found were as follows:

- SA1 topsoil between 0.00 – 0.30mbgl (metres below ground level); Grey/brownish slightly sandy clay with rounded cobbles between 0.30 – 2.00mbgl.
- SA2 topsoil between 0.00 – 0.28mbgl; Grey/mottled brown clay with fine to medium sand and sub angular medium to coarse limestone gravel and rounded sandstone gravel between 0.28 – 0.80mbgl; Grey clay with fine to medium gravel and sub rounded to rounded sandstone gravel between 0.28 – 2.00mbgl.
- SA3 topsoil between 0.00 – 0.30mbgl; Grey/brown mottled clay with fine to coarse sand and rounded coarse sandstone gravel and cobbles and boulders between 0.30 – 2.2mbgl.

Soakaway test methodology

The test method was in accordance with BRE365.

- The base of each trial hole was approximately at the depth anticipated in full-size soakaways (typically 1.5-2.5m depth for areas <100m^2). The depth of the trail hole was recorded on each test sheet.
- The length and width of each trial hole was within the range 0.3m -1m wide and 1m-3m long. The length and width were recorded on each test sheet.
- Each trial hole was rapidly filled with water from a bowser to mimic a runoff event. The water level and time in minutes from filling the trial hole was recorded on each test sheet.
- Each test should be repeated twice more (3 times in total), allowing the trial hole to drain between tests.
- Where drain times are excessively slow, it is unnecessary to repeat the first test.
- On completion the soakaway pits were backfilled with the arisings and compacted to ground level.

A tractor-towed water bowser was used for the water supply with a large outlet valve. The trial pits were filled to approximately 1mbgl and sides remained stable and vertical during filling. Tests were undertaken for 1440 minutes due to the low infiltration rates.

enzygo environmental consultants

Samuel House, 5 Fox Valley Way
Stockbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

Results and Conclusions

The soakaway test results are summarised in Table 1 and included as Appendix 1. Drain times were excessively long for Test 1 in all three soakaway pits such that uptake was insufficient to calculate an infiltration rate.
The water level in all three pits did not recede from full to half-volume within 24 hours and therefore all are considered to have failed the soakaway testing in accordance with BRE Digest 365 guidance.

No groundwater was encountered in any of the test pits. However, infiltration rates were not found to be favourable for an infiltration-based surface water drainage system.

If you have any queries, or require further information, please contact us.

Yours sincerely,

I Hopkinson

Ian Hopkinson BSc (Hons), MSc, MCIWEM
Consultant Hydrologist

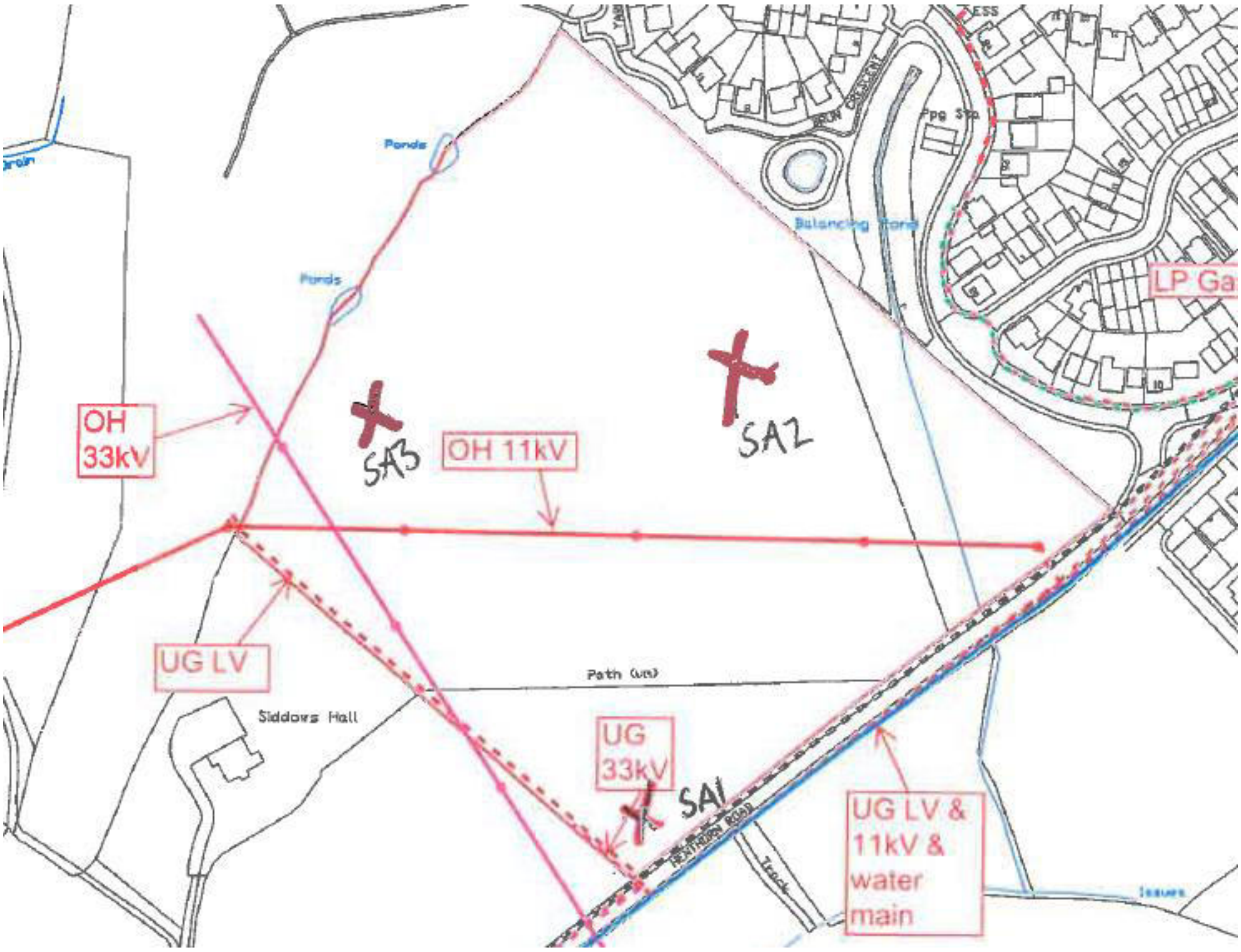
Samuel House, 5 Fox Valley Way
Stocksbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

Table 1 – Test Results

Exploratory Hole	Depth (m bgl)	Test No	Water level start of test (m bgl)	Water level end of test (m bgl) (fall/duration)	Change in level (m)	Test Duration (minutes)	Extrapolated/ Soil Infiltration Rate (m/s)	Design Soil Infiltration Rate (m/hr)
SA1	2.00	1	1.00	1.12	0.12	1440	N/A	**Insufficient uptake to calculate infiltration rate**
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	
SA2	2.00	1	1.10	0.85	0.00	1440	N/A	**Insufficient uptake to calculate infiltration rate**
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	
SA3	2.20	1	0.87	0.88	0.01	1440	N/A	**Insufficient uptake to calculate infiltration rate**
		2	N/A	N/A	N/A	N/A	N/A	
		3	N/A	N/A	N/A	N/A	N/A	

Figure 2 – Site Location with locations of constraints: SA1 – SA3 locations



Samuel House, 5 Fox Valley Way
Stocksbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

SA1 Test Pit

SA1 Test Pit Arisings

SA2 Test Pit

SA2 Test Pit Arisings

Samuel House, 5 Fox Valley Way
Stocksbridge, Sheffield, S36 2AA

Tel: 0114 321 51 51
www.enzygo.com

SA3 Test Pit

SA3 Test Pit Arisings

Appendix 6 - Drainage Calculations

Greenfield runoff rate estimation tool

hr wallingford

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for 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.

Project details

Date	28/09/2025
Calculated by	
Reference	
Model version	2.1.2

Location

Site name	Eastern Parcel
Site location	Clitheroe

© OpenStreetMap (https://www.openstreetmap.org/copyright) contributors.

Site easting (British National Grid)	372868
Site northing (British National Grid)	440618

Site details

Total site area (ha)	1.246 ha

Greenfield runoff

Method

Method	FEH statistical

FEH statistical

	My value		Map value
SAAR (mm)	1178 mm		1178
BFIHOST	0.417		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	13.7 l/s		
QBar (FEH statistical) (l/s)	14.72 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical
Flow rate 1 year (l/s)	12.8 l/s
Flow rate 2 year (l/s)	13.7 l/s
Flow rate 10 years (l/s)	20.3 l/s
Flow rate 30 years (l/s)	25.0 l/s
Flow rate 100 years (l/s)	30.6 l/s
Flow rate 200 years (l/s)	34.9 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

Greenfield runoff rate estimation tool

hr wallingford

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

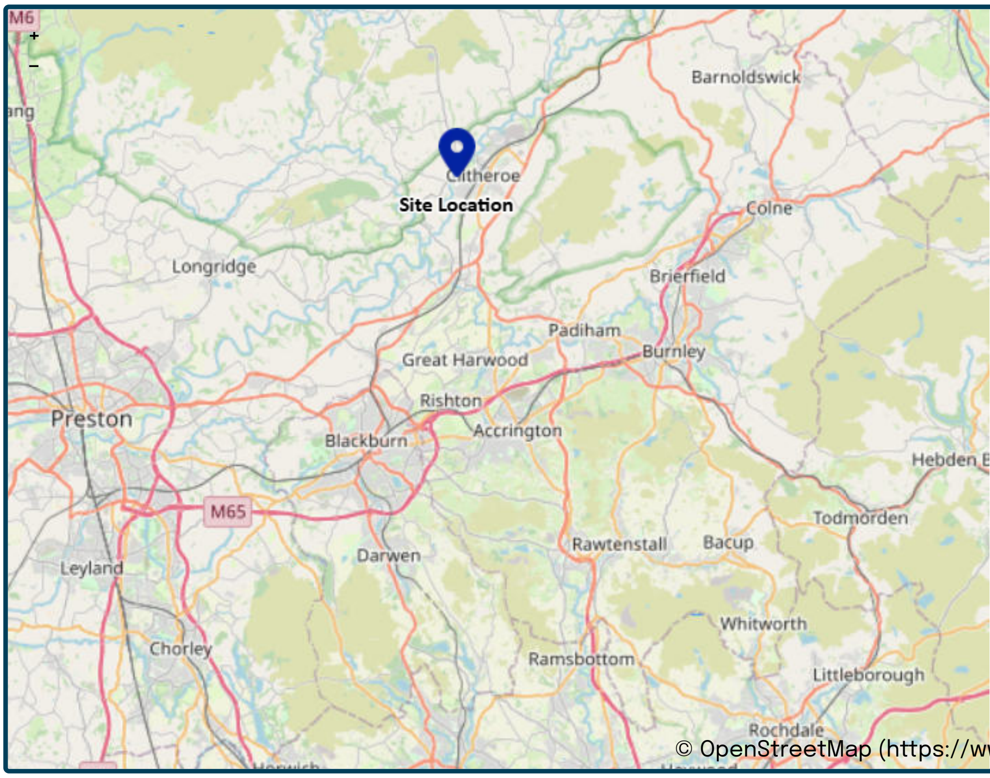
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	28/09/2025
Calculated by	
Reference	
Model version	2.1.2

Location

Site name	Eastern Parcel
Site location	Clitheroe



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Site easting (British National Grid)	372868
Site northing (British National Grid)	440618

Site details

Total site area (ha)	0.54 ha

Greenfield runoff

Method

Method	FEH statistical

FEH statistical

	My value		Map value
SAAR (mm)	1178	mm	1178
BFIHOST	0.417		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	5.94	l/s	
QBar (FEH statistical) (l/s)	6.38	l/s	

Growth curve factors

	My value	Map value
Hydrological region	10	10
1 year growth factor	0.87	
2 year growth factor	0.93	
10 year growth factor	1.38	
30 year growth factor	1.7	
100 year growth factor	2.08	
200 year growth factor	2.37	

Results

Method	FEH statistical	
Flow rate 1 year (l/s)	5.6	l/s
Flow rate 2 year (l/s)	5.9	l/s
Flow rate 10 years (l/s)	8.8	l/s
Flow rate 30 years (l/s)	10.8	l/s
Flow rate 100 years (l/s)	13.3	l/s
Flow rate 200 years (l/s)	15.1	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.1.2) developed by HR Wallingford and available at uksuds.com (https://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 uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.063	5.00	53.963	1200	372967.173	440683.387	1.350	52.613
2	0.063	5.00	53.920	1200	372989.351	440671.849	1.632	52.288
3	0.063	5.00	53.848	1200	373005.046	440653.036	1.704	52.144
4	0.063	5.00	53.928	1200	373013.917	440634.002	1.908	52.020
5	0.063	5.00	57.927	1200	373198.649	440643.121	1.350	56.577
6	0.063	5.00	56.164	1200	373150.115	440655.142	2.162	54.002
7	0.063	5.00	56.219	1200	373160.246	440599.239	1.350	54.869
8	0.063	5.00	55.870	1200	373140.319	440626.787	2.044	53.826
9	0.063	5.00	55.375	1200	373089.096	440665.494	1.350	54.025
10	0.063	5.00	55.373	1200	373094.322	440627.351	1.883	53.490
11	0.063	5.00	54.844	1200	373069.360	440617.061	1.504	53.340
12	0.063	5.00	54.591	1200	373056.831	440612.033	1.521	53.070
13	0.063	5.00	54.254	1200	373073.254	440558.093	1.350	52.904
14	0.063	5.00	54.396	1200	373053.607	440587.300	1.919	52.477
15	0.063	5.00	54.315	1350	373044.902	440610.735	2.135	52.180
16	0.063	5.00	53.739	1350	373011.196	440615.198	1.981	51.758
17	0.063	5.00	53.549	1350	373004.467	440601.792	1.841	51.708
18	0.063	5.00	53.184	1350	372972.193	440563.603	1.643	51.541
19	0.063	5.00	52.636	1200	373001.805	440510.588	1.425	51.211
20	0.063	5.00	52.916	1350	372955.965	440537.190	2.242	50.674
21			52.702	1350	372931.500	440538.500	2.110	50.592
22			52.462	1800	372917.743	440531.826	1.921	50.541
23			51.000	1350	372883.851	440488.167	0.784	50.216

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	25.000	0.600	52.613	52.363	0.250	100.0	150	5.41	44.2
1.001	2	3	24.500	0.600	52.288	52.144	0.144	170.0	225	5.82	42.9
1.002	3	4	21.000	0.600	52.144	52.020	0.124	170.0	225	6.17	41.9
1.003	4	16	19.000	0.600	52.020	51.908	0.112	170.0	225	6.49	41.0
2.000	5	6	50.001	0.600	56.577	54.077	2.500	20.0	150	5.37	44.4
2.001	6	8	29.999	0.600	54.002	53.826	0.176	170.0	225	5.87	42.8
3.000	7	8	34.000	0.600	54.869	54.529	0.340	100.0	150	5.56	43.8
2.002	8	10	46.000	0.600	53.826	53.565	0.261	176.2	225	6.65	40.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.005	17.8	7.6	1.200	1.407	0.063	0.0	68	0.964
1.001	1.000	39.7	14.7	1.407	1.479	0.126	0.0	94	0.926
1.002	1.000	39.7	21.4	1.479	1.683	0.189	0.0	117	1.017
1.003	1.000	39.7	28.0	1.683	1.606	0.252	0.0	139	1.080
2.000	2.262	40.0	7.6	1.200	1.937	0.063	0.0	44	1.747
2.001	1.000	39.7	14.6	1.937	1.819	0.126	0.0	94	0.926
3.000	1.005	17.8	7.5	1.200	1.191	0.063	0.0	68	0.961
2.002	0.982	39.0	27.7	1.819	1.583	0.252	0.0	140	1.063

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.000	9	10	38.499	0.600	54.025	53.640	0.385	100.0	150	5.64	43.5
2.003	10	11	27.000	0.600	53.490	53.340	0.150	180.0	300	7.03	39.5
2.004	11	12	13.500	0.600	53.340	53.070	0.270	50.0	300	7.14	39.3
2.005	12	15	11.999	0.600	53.070	52.770	0.300	40.0	300	7.22	39.1
5.000	13	14	35.200	0.600	52.904	52.552	0.352	100.0	150	5.58	43.7
5.001	14	15	25.000	0.600	52.477	52.330	0.147	170.0	225	6.00	42.3
2.006	15	16	34.000	0.600	52.180	52.067	0.113	300.0	375	7.76	37.8
1.004	16	17	15.000	0.600	51.758	51.708	0.050	300.0	375	8.00	37.2
1.005	17	18	50.000	0.600	51.708	51.541	0.167	300.0	375	8.80	35.6
1.006	18	20	31.000	0.600	51.541	51.231	0.310	100.0	375	9.09	35.1
6.000	19	20	53.000	0.600	51.211	50.899	0.312	170.0	225	5.88	42.7
1.007	20	21	24.500	0.600	50.674	50.592	0.082	300.0	450	9.44	34.5
1.008	21	22	15.290	0.600	50.592	50.541	0.051	300.0	450	9.65	34.1
1.009	22	23	55.270	0.600	50.541	50.216	0.325	170.0	450	10.25	33.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
4.000	1.005	17.8	7.4	1.200	1.583	0.063	0.0	68	0.961
2.003	1.168	82.6	40.5	1.583	1.204	0.378	0.0	148	1.162
2.004	2.228	157.5	46.9	1.204	1.221	0.441	0.0	112	1.950
2.005	2.493	176.2	53.4	1.221	1.245	0.504	0.0	113	2.193
5.000	1.005	17.8	7.5	1.200	1.694	0.063	0.0	68	0.961
5.001	1.000	39.7	14.5	1.694	1.760	0.126	0.0	94	0.922
2.006	1.041	114.9	71.0	1.760	1.297	0.693	0.0	214	1.093
1.004	1.041	114.9	101.7	1.606	1.466	1.008	0.0	276	1.169
1.005	1.041	114.9	103.4	1.466	1.268	1.071	0.0	279	1.171
1.006	1.812	200.1	107.8	1.268	1.310	1.134	0.0	196	1.843
6.000	1.000	39.7	7.3	1.200	1.792	0.063	0.0	65	0.768
1.007	1.168	185.8	117.7	1.792	1.660	1.260	0.0	261	1.234
1.008	1.168	185.8	116.4	1.660	1.471	1.260	0.0	259	1.231
1.009	1.556	247.5	113.0	1.471	0.334	1.260	0.0	213	1.522

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	25.000	100.0	150	Circular_Default Sewer Type	53.963	52.613	1.200	53.920	52.363	1.407
1.001	24.500	170.0	225	Circular_Default Sewer Type	53.920	52.288	1.407	53.848	52.144	1.479
1.002	21.000	170.0	225	Circular_Default Sewer Type	53.848	52.144	1.479	53.928	52.020	1.683
1.003	19.000	170.0	225	Circular_Default Sewer Type	53.928	52.020	1.683	53.739	51.908	1.606
2.000	50.001	20.0	150	Circular_Default Sewer Type	57.927	56.577	1.200	56.164	54.077	1.937
2.001	29.999	170.0	225	Circular_Default Sewer Type	56.164	54.002	1.937	55.870	53.826	1.819
3.000	34.000	100.0	150	Circular_Default Sewer Type	56.219	54.869	1.200	55.870	54.529	1.191
2.002	46.000	176.2	225	Circular_Default Sewer Type	55.870	53.826	1.819	55.373	53.565	1.583
4.000	38.499	100.0	150	Circular_Default Sewer Type	55.375	54.025	1.200	55.373	53.640	1.583

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	16	1350	Manhole	Adoptable
2.000	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
2.001	6	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
3.000	7	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
2.002	8	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable
4.000	9	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.003	27.000	180.0	300	Circular_Default Sewer Type	55.373	53.490	1.583	54.844	53.340	1.204
2.004	13.500	50.0	300	Circular_Default Sewer Type	54.844	53.340	1.204	54.591	53.070	1.221
2.005	11.999	40.0	300	Circular_Default Sewer Type	54.591	53.070	1.221	54.315	52.770	1.245
5.000	35.200	100.0	150	Circular_Default Sewer Type	54.254	52.904	1.200	54.396	52.552	1.694
5.001	25.000	170.0	225	Circular_Default Sewer Type	54.396	52.477	1.694	54.315	52.330	1.760
2.006	34.000	300.0	375	Circular_Default Sewer Type	54.315	52.180	1.760	53.739	52.067	1.297
1.004	15.000	300.0	375	Circular_Default Sewer Type	53.739	51.758	1.606	53.549	51.708	1.466
1.005	50.000	300.0	375	Circular_Default Sewer Type	53.549	51.708	1.466	53.184	51.541	1.268
1.006	31.000	100.0	375	Circular_Default Sewer Type	53.184	51.541	1.268	52.916	51.231	1.310
6.000	53.000	170.0	225	Circular_Default Sewer Type	52.636	51.211	1.200	52.916	50.899	1.792
1.007	24.500	300.0	450	Circular_Default Sewer Type	52.916	50.674	1.792	52.702	50.592	1.660
1.008	15.290	300.0	450	Circular_Default Sewer Type	52.702	50.592	1.660	52.462	50.541	1.471
1.009	55.270	170.0	450	Circular_Default Sewer Type	52.462	50.541	1.471	51.000	50.216	0.334

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.003	10	1200	Manhole	Adoptable	11	1200	Manhole	Adoptable
2.004	11	1200	Manhole	Adoptable	12	1200	Manhole	Adoptable
2.005	12	1200	Manhole	Adoptable	15	1350	Manhole	Adoptable
5.000	13	1200	Manhole	Adoptable	14	1200	Manhole	Adoptable
5.001	14	1200	Manhole	Adoptable	15	1350	Manhole	Adoptable
2.006	15	1350	Manhole	Adoptable	16	1350	Manhole	Adoptable
1.004	16	1350	Manhole	Adoptable	17	1350	Manhole	Adoptable
1.005	17	1350	Manhole	Adoptable	18	1350	Manhole	Adoptable
1.006	18	1350	Manhole	Adoptable	20	1350	Manhole	Adoptable
6.000	19	1200	Manhole	Adoptable	20	1350	Manhole	Adoptable
1.007	20	1350	Manhole	Adoptable	21	1350	Manhole	Adoptable
1.008	21	1350	Manhole	Adoptable	22	1800	Manhole	Adoptable
1.009	22	1800	Manhole	Adoptable	23	1350	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	20.0	100 year 360 minute (m³)	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	50	5	0
30	0	0	0				

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.10	Betterment (%)	0
Greenfield Method	IH124	Region	1	QBar	
Positively Drained Area (ha)		Growth Factor 1 year	0.85	Q 1 year (l/s)	
SAAR (mm)		Growth Factor 30 year	1.95	Q 30 year (l/s)	
Soil Index	1	Growth Factor 100 year	2.48	Q 100 year (l/s)	

Pre-development Discharge Volume

Site Makeup	Greenfield	SPR	0.10	Storm Duration (mins)	360
Greenfield Method	FSR/FEH	CWI		Betterment (%)	0
Positively Drained Area (ha)		Return Period (years)	100	PR	
Soil Index	1	Climate Change (%)	0	Runoff Volume (m³)	

Node 22 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	50.541	Product Number	CTL-SHE-0166-1470-1500-1470
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	14.7	Min Node Diameter (mm)	1500

Node 22 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.541
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	375.0	0.0	1.500	1016.0	0.0	1.800	1172.0	0.0	1.801	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.41%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	52.694	0.081	9.9	0.1681	0.0000	OK
15 minute summer	2	12	52.402	0.114	19.5	0.2166	0.0000	OK
15 minute summer	3	12	52.392	0.248	29.1	0.4631	0.0000	SURCHARGED
15 minute summer	4	12	52.343	0.323	38.0	0.5789	0.0000	SURCHARGED
15 minute summer	5	10	56.628	0.051	9.9	0.1051	0.0000	OK
15 minute summer	6	10	54.111	0.109	19.5	0.1873	0.0000	OK
15 minute summer	7	11	54.949	0.080	9.9	0.1658	0.0000	OK
15 minute summer	8	11	54.010	0.184	38.5	0.3217	0.0000	OK
15 minute summer	9	11	54.105	0.080	9.9	0.1653	0.0000	OK
15 minute summer	10	11	53.678	0.188	56.0	0.3389	0.0000	OK
15 minute summer	11	11	53.489	0.149	65.2	0.2936	0.0000	OK
15 minute summer	12	11	53.224	0.154	74.4	0.3022	0.0000	OK
15 minute summer	13	11	52.984	0.080	9.9	0.1657	0.0000	OK
15 minute summer	14	10	52.591	0.114	19.3	0.2042	0.0000	OK
15 minute summer	15	11	52.462	0.282	102.8	0.5711	0.0000	OK
15 minute summer	16	12	52.255	0.497	139.7	1.0270	0.0000	SURCHARGED
15 minute summer	17	12	52.139	0.431	147.6	0.9122	0.0000	SURCHARGED
15 minute summer	18	12	51.811	0.270	155.1	0.5926	0.0000	OK
15 minute summer	19	11	51.479	0.268	29.3	0.5395	0.0000	SURCHARGED
15 minute summer	20	10	51.495	0.821	182.6	1.6361	0.0000	SURCHARGED
15 minute summer	21	10	51.422	0.830	190.4	1.1874	0.0000	SURCHARGED
480 minute summer	22	320	50.983	0.442	50.9	208.7997	0.0000	OK
480 minute summer	23	320	50.289	0.073	14.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	9.6	1.011	0.541	0.2382	
15 minute summer	2	1.001	3	19.3	0.806	0.485	0.7338	
15 minute summer	3	1.002	4	28.1	0.875	0.706	0.8352	
15 minute summer	4	1.003	16	34.1	1.009	0.858	0.7557	
15 minute summer	5	2.000	6	9.6	1.851	0.241	0.2606	
15 minute summer	6	2.001	8	19.2	0.760	0.483	0.8081	
15 minute summer	7	3.000	8	9.6	1.016	0.541	0.3214	
15 minute summer	8	2.002	10	37.0	1.139	0.949	1.5011	
15 minute summer	9	4.000	10	9.6	1.018	0.541	0.3631	
15 minute summer	10	2.003	11	55.9	1.376	0.676	1.1000	
15 minute summer	11	2.004	12	65.0	1.824	0.413	0.4822	
15 minute summer	12	2.005	15	74.1	2.211	0.420	0.4022	
15 minute summer	13	5.000	14	9.6	1.017	0.541	0.3326	
15 minute summer	14	5.001	15	19.3	0.932	0.487	0.5554	
15 minute summer	15	2.006	16	100.8	1.255	0.877	2.7363	
15 minute summer	16	1.004	17	140.0	1.269	1.218	1.6545	
15 minute summer	17	1.005	18	147.5	1.400	1.283	4.8778	
15 minute summer	18	1.006	20	154.4	1.932	0.771	2.4814	
15 minute summer	19	6.000	20	28.1	0.706	0.706	2.1079	
15 minute summer	20	1.007	21	190.4	1.355	1.025	3.8819	
15 minute summer	21	1.008	22	208.9	2.628	1.125	1.2658	
480 minute summer	22	1.009	23	14.6	0.866	0.059	0.9334	363.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	19	53.963	1.350	22.7	2.7864	1.4818	FLOOD
30 minute summer	2	19	53.919	1.631	32.0	3.1044	0.3298	FLOOD
30 minute summer	3	19	53.848	1.704	44.6	3.1865	0.9686	FLOOD
15 minute summer	4	12	53.758	1.738	57.5	3.1133	0.0000	FLOOD RISK
15 minute summer	5	11	56.660	0.083	23.9	0.1721	0.0000	OK
15 minute summer	6	13	55.348	1.346	47.6	2.3077	0.0000	SURCHARGED
15 minute summer	7	13	55.486	0.617	23.9	1.2733	0.0000	SURCHARGED
15 minute summer	8	13	55.215	1.389	72.1	2.4266	0.0000	SURCHARGED
15 minute summer	9	13	54.790	0.765	23.9	1.5792	0.0000	SURCHARGED
15 minute summer	10	12	54.487	0.997	102.5	1.7940	0.0000	SURCHARGED
15 minute summer	11	12	54.258	0.918	112.3	1.8074	0.0000	SURCHARGED
15 minute summer	12	12	54.073	1.003	129.7	1.9650	0.0000	SURCHARGED
15 minute summer	13	13	54.212	1.308	23.9	2.7004	0.0000	FLOOD RISK
15 minute summer	14	12	53.947	1.470	34.6	2.6292	0.0000	SURCHARGED
15 minute summer	15	12	53.848	1.668	168.9	3.3726	0.0000	SURCHARGED
15 minute summer	16	12	53.545	1.787	234.3	3.6936	0.0000	FLOOD RISK
15 minute summer	17	12	53.223	1.515	251.5	3.2058	0.0000	SURCHARGED
15 minute summer	18	12	52.288	0.747	269.0	1.6425	0.0000	SURCHARGED
15 minute summer	19	9	51.926	0.715	42.2	1.4405	0.0000	SURCHARGED
15 minute winter	20	9	51.754	1.080	300.2	2.1524	0.0000	SURCHARGED
15 minute winter	21	8	51.678	1.086	302.0	1.5534	0.0000	SURCHARGED
480 minute summer	22	376	51.349	0.808	95.2	444.6994	0.0000	SURCHARGED
240 minute summer	23	460	50.289	0.073	14.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	1	1.000	2	14.3	1.082	0.804	0.4401	
30 minute summer	2	1.001	3	25.5	0.821	0.641	0.9744	
30 minute summer	3	1.002	4	38.0	0.956	0.956	0.8352	
15 minute summer	4	1.003	16	50.1	1.259	1.260	0.7557	
15 minute summer	5	2.000	6	23.7	2.072	0.593	0.6915	
15 minute summer	6	2.001	8	33.4	0.841	0.841	1.1931	
15 minute summer	7	3.000	8	19.7	1.120	1.111	0.5986	
15 minute summer	8	2.002	10	61.5	1.546	1.576	1.8295	
15 minute summer	9	4.000	10	18.7	1.082	1.054	0.6778	
15 minute summer	10	2.003	11	91.8	1.445	1.112	1.9013	
15 minute summer	11	2.004	12	107.8	1.923	0.684	0.9507	
15 minute summer	12	2.005	15	126.1	2.285	0.716	0.8450	
15 minute summer	13	5.000	14	15.4	1.083	0.865	0.6197	
15 minute summer	14	5.001	15	30.8	0.958	0.775	0.9943	
15 minute summer	15	2.006	16	170.3	1.544	1.482	3.7501	
15 minute summer	16	1.004	17	234.5	2.126	2.040	1.6545	
15 minute summer	17	1.005	18	250.2	2.269	2.177	5.5149	
15 minute summer	18	1.006	20	268.6	2.435	1.342	3.4192	
15 minute summer	19	6.000	20	29.2	0.734	0.734	2.1079	
15 minute winter	20	1.007	21	302.0	1.906	1.626	3.8819	
15 minute winter	21	1.008	22	308.9	2.845	1.663	2.2042	
480 minute summer	22	1.009	23	14.7	0.867	0.059	0.9371	496.2

Results for 100 year +50% CC +5% A Critical Storm Duration. Lowest mass balance: 99.56%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	1	30	53.963	1.350	36.1	2.8499	13.5203	FLOOD
30 minute summer	2	16	53.920	1.632	51.9	3.1693	7.0641	FLOOD
60 minute summer	3	30	53.848	1.704	62.8	3.2495	29.3397	FLOOD
30 minute summer	4	16	53.897	1.877	63.5	3.4237	0.0000	FLOOD RISK
15 minute summer	5	11	57.927	1.350	46.9	2.8499	1.1284	FLOOD
30 minute summer	6	17	56.164	2.162	76.1	3.7684	6.2333	FLOOD
30 minute summer	7	17	56.219	1.350	45.1	2.8499	6.3362	FLOOD
60 minute summer	8	31	55.870	2.044	99.9	3.6342	15.1046	FLOOD
60 minute summer	9	31	55.375	1.350	36.1	2.8499	7.9364	FLOOD
15 minute summer	10	10	55.214	1.724	121.8	3.1621	0.0000	FLOOD RISK
30 minute summer	11	17	54.844	1.504	159.4	3.0245	6.9835	FLOOD
30 minute summer	12	17	54.591	1.521	168.7	3.0435	4.2175	FLOOD
60 minute summer	13	30	54.254	1.350	43.8	2.8499	17.8574	FLOOD
15 minute summer	14	10	54.396	1.919	47.7	3.4926	0.2943	FLOOD
15 minute summer	15	10	54.276	2.096	223.1	4.2988	0.0000	FLOOD RISK
30 minute summer	16	16	53.739	1.981	304.2	4.1581	26.3002	FLOOD
15 minute summer	17	9	53.521	1.813	257.3	3.8974	0.0000	FLOOD RISK
15 minute summer	18	9	52.692	1.151	289.4	2.5749	0.0000	SURCHARGED
15 minute winter	19	8	52.336	1.125	44.0	2.3172	0.0000	FLOOD RISK
720 minute winter	20	675	52.038	1.364	90.0	2.7568	0.0000	SURCHARGED
720 minute winter	21	675	52.037	1.445	89.2	2.0683	0.0000	SURCHARGED
720 minute winter	22	675	52.037	1.496	89.1	1042.7520	0.0000	SURCHARGED
15 minute winter	23	52	50.289	0.073	14.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	1	1.000	2	13.4	1.027	0.755	0.4401	
30 minute summer	2	1.001	3	25.5	0.809	0.640	0.9744	
60 minute summer	3	1.002	4	35.8	0.908	0.901	0.8352	
30 minute summer	4	1.003	16	48.3	1.215	1.215	0.7557	
15 minute summer	5	2.000	6	32.0	1.983	0.801	0.8803	
30 minute summer	6	2.001	8	47.1	1.185	1.185	1.1931	
30 minute summer	7	3.000	8	18.4	1.097	1.037	0.5986	
60 minute summer	8	2.002	10	70.9	1.783	1.817	1.8295	
60 minute summer	9	4.000	10	17.5	1.114	0.984	0.6778	
15 minute summer	10	2.003	11	115.0	1.634	1.393	1.9013	
30 minute summer	11	2.004	12	128.9	1.916	0.818	0.9507	
30 minute summer	12	2.005	15	155.7	2.352	0.884	0.8450	
60 minute summer	13	5.000	14	14.7	1.064	0.828	0.6197	
15 minute summer	14	5.001	15	33.1	0.940	0.832	0.9943	
15 minute summer	15	2.006	16	223.1	2.023	1.941	3.7501	
30 minute summer	16	1.004	17	242.1	2.195	2.106	1.6545	
15 minute summer	17	1.005	18	261.4	2.371	2.275	5.5149	
15 minute summer	18	1.006	20	291.0	2.638	1.454	3.4192	
15 minute winter	19	6.000	20	45.3	1.138	1.139	2.1079	
720 minute winter	20	1.007	21	89.2	0.691	0.480	3.8819	
720 minute winter	21	1.008	22	89.1	1.103	0.479	2.4226	
720 minute winter	22	1.009	23	14.7	0.867	0.059	0.9367	691.9

Design Settings

Rainfall Methodology	FEH-22
Return Period (years)	2
Additional Flow (%)	0
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	75.0

Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Include Intermediate Ground	✓
Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.045	5.00	53.780	1200	372902.100	440702.400	1.425	52.355
2	0.045	5.00	57.501	1200	372859.364	440737.674	1.901	55.600
3	0.045	5.00	53.717	1200	372889.717	440694.649	1.492	52.225
4	0.045	5.00	55.209	1200	372851.635	440686.033	3.289	51.920
5	0.045	5.00	55.544	1200	372838.499	440677.253	3.688	51.856
6	0.045	5.00	54.942	1200	372816.301	440654.904	3.215	51.727
7	0.045	5.00	56.895	1200	372785.065	440662.016	1.350	55.545
8	0.045	5.00	54.379	1200	372806.280	440643.742	2.713	51.666
9	0.045	5.00	53.217	1200	372903.484	440673.437	1.350	51.867
10	0.045	5.00	52.912	1200	372882.310	440655.715	1.509	51.403
11	0.045	5.00	52.260	1200	372856.303	440632.930	1.438	50.822
12	0.045	5.00	52.013	1200	372836.858	440619.697	1.541	50.472
13	0.000		51.746	1200	372829.056	440612.498	1.539	50.207
14	0.000		52.023	1200	372818.152	440619.376	2.033	49.990
15	0.000		51.793	1200	372813.455	440613.673	1.928	49.865
16	0.000		51.121	1200	372799.029	440590.942	1.709	49.412

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	3	14.609	0.600	52.355	52.269	0.086	170.0	225	5.24	44.8
2.000	2	3	52.654	0.600	55.600	52.300	3.300	16.0	150	5.35	44.5
1.001	3	4	39.045	0.600	52.225	51.995	0.230	170.0	225	6.00	42.3
1.002	4	5	15.800	0.600	51.920	51.856	0.064	245.0	300	6.26	41.6
1.003	5	6	31.500	0.600	51.856	51.727	0.129	245.0	300	6.79	40.2
1.004	6	8	15.000	0.600	51.727	51.666	0.061	245.0	300	7.04	39.5
3.000	7	8	28.000	0.600	55.545	52.745	2.800	10.0	150	5.15	45.1
1.005	8	12	38.900	0.600	51.666	50.888	0.778	50.0	300	7.33	38.8
4.000	9	10	27.612	0.600	51.867	51.403	0.464	59.5	150	5.35	44.4
4.001	10	11	34.576	0.600	51.403	50.822	0.581	59.5	150	5.79	43.0
4.002	11	12	23.521	0.600	50.822	50.622	0.200	117.6	150	6.22	41.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.000	39.7	5.5	1.200	1.223	0.045	0.0	56	0.702
2.000	2.534	44.8	5.4	1.751	1.267	0.045	0.0	35	1.712
1.001	1.000	39.7	15.5	1.267	2.989	0.135	0.0	97	0.937
1.002	1.000	70.7	20.3	2.989	3.388	0.180	0.0	110	0.867
1.003	1.000	70.7	24.5	3.388	2.915	0.225	0.0	122	0.911
1.004	1.000	70.7	28.9	2.915	2.413	0.270	0.0	133	0.950
3.000	3.204	56.6	5.5	1.200	1.484	0.045	0.0	31	2.035
1.005	2.228	157.5	37.9	2.413	0.825	0.360	0.0	100	1.845
4.000	1.306	23.1	5.4	1.200	1.359	0.045	0.0	50	1.071
4.001	1.306	23.1	10.5	1.359	1.288	0.090	0.0	71	1.277
4.002	0.925	16.4	15.3	1.288	1.241	0.135	0.0	115	1.049

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.006	12	13	10.616	0.600	50.472	50.207	0.265	40.0	300	7.40	38.6
1.007	13	14	12.892	0.600	50.207	49.990	0.217	59.4	300	7.50	38.4
1.008	14	15	7.388	0.600	49.990	49.865	0.125	59.1	300	7.56	38.3
1.009	15	16	26.922	0.600	49.865	49.412	0.453	59.4	300	7.78	37.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.006	2.493	176.2	56.6	1.241	1.239	0.540	0.0	116	2.226
1.007	2.043	144.4	56.2	1.239	1.733	0.540	0.0	130	1.920
1.008	2.049	144.8	56.0	1.733	1.628	0.540	0.0	129	1.921
1.009	2.043	144.4	55.3	1.628	1.409	0.540	0.0	129	1.912

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	14.609	170.0	225	Circular_Default Sewer Type	53.780	52.355	1.200	53.717	52.269	1.223
2.000	52.654	16.0	150	Circular_Default Sewer Type	57.501	55.600	1.751	53.717	52.300	1.267
1.001	39.045	170.0	225	Circular_Default Sewer Type	53.717	52.225	1.267	55.209	51.995	2.989
1.002	15.800	245.0	300	Circular_Default Sewer Type	55.209	51.920	2.989	55.544	51.856	3.388
1.003	31.500	245.0	300	Circular_Default Sewer Type	55.544	51.856	3.388	54.942	51.727	2.915
1.004	15.000	245.0	300	Circular_Default Sewer Type	54.942	51.727	2.915	54.379	51.666	2.413
3.000	28.000	10.0	150	Circular_Default Sewer Type	56.895	55.545	1.200	54.379	52.745	1.484
1.005	38.900	50.0	300	Circular_Default Sewer Type	54.379	51.666	2.413	52.013	50.888	0.825
4.000	27.612	59.5	150	Circular_Default Sewer Type	53.217	51.867	1.200	52.912	51.403	1.359
4.001	34.576	59.5	150	Circular_Default Sewer Type	52.912	51.403	1.359	52.260	50.822	1.288
4.002	23.521	117.6	150	Circular_Default Sewer Type	52.260	50.822	1.288	52.013	50.622	1.241
1.006	10.616	40.0	300	Circular_Default Sewer Type	52.013	50.472	1.241	51.746	50.207	1.239
1.007	12.892	59.4	300	Circular_Default Sewer Type	51.746	50.207	1.239	52.023	49.990	1.733
1.008	7.388	59.1	300	Circular_Default Sewer Type	52.023	49.990	1.733	51.793	49.865	1.628
1.009	26.922	59.4	300	Circular_Default Sewer Type	51.793	49.865	1.628	51.121	49.412	1.409

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
2.000	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.001	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.002	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable
1.003	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
1.004	6	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
3.000	7	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.005	8	1200	Manhole	Adoptable	12	1200	Manhole	Adoptable
4.000	9	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable
4.001	10	1200	Manhole	Adoptable	11	1200	Manhole	Adoptable
4.002	11	1200	Manhole	Adoptable	12	1200	Manhole	Adoptable
1.006	12	1200	Manhole	Adoptable	13	1200	Manhole	Adoptable
1.007	13	1200	Manhole	Adoptable	14	1200	Manhole	Adoptable
1.008	14	1200	Manhole	Adoptable	15	1200	Manhole	Adoptable
1.009	15	1200	Manhole	Adoptable	16	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	20.0	100 year 360 minute (m³)	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	50	5	0
30	0	0	0				

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.10	Betterment (%)	0
Greenfield Method	IH124	Region	1	QBar	
Positively Drained Area (ha)		Growth Factor 1 year	0.85	Q 1 year (l/s)	
SAAR (mm)		Growth Factor 30 year	1.95	Q 30 year (l/s)	
Soil Index	1	Growth Factor 100 year	2.48	Q 100 year (l/s)	

Pre-development Discharge Volume

Site Makeup	Greenfield	SPR	0.10	Storm Duration (mins)	360
Greenfield Method	FSR/FEH	CWI		Betterment (%)	0
Positively Drained Area (ha)		Return Period (years)	100	PR	
Soil Index	1	Climate Change (%)	0	Runoff Volume (m³)	

Node 15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	49.865	Product Number	CTL-SHE-0111-6400-1500-6400
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.4	Min Node Diameter (mm)	1200

Node 15 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.865
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	152.0	0.0	1.500	440.0	0.0	1.800	510.0	0.0	1.801	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	52.421	0.066	7.1	0.1171	0.0000	OK
15 minute summer	2	10	55.640	0.040	7.1	0.0647	0.0000	OK
15 minute summer	3	11	52.343	0.118	21.0	0.2039	0.0000	OK
15 minute summer	4	11	52.062	0.142	27.3	0.2000	0.0000	OK
15 minute summer	5	11	52.009	0.153	34.0	0.2100	0.0000	OK
15 minute summer	6	11	51.891	0.164	40.7	0.2312	0.0000	OK
15 minute summer	7	10	55.581	0.036	7.1	0.0652	0.0000	OK
15 minute summer	8	11	51.791	0.125	53.9	0.1824	0.0000	OK
15 minute summer	9	10	51.924	0.057	7.1	0.1017	0.0000	OK
15 minute summer	10	11	51.486	0.083	14.1	0.1435	0.0000	OK
15 minute summer	11	12	51.033	0.211	20.8	0.3707	0.0000	SURCHARGED
15 minute summer	12	11	50.634	0.162	78.9	0.2783	0.0000	OK
15 minute summer	13	11	50.389	0.182	78.6	0.2054	0.0000	OK
15 minute winter	14	7	50.308	0.318	73.1	0.3592	0.0000	SURCHARGED
360 minute summer	15	240	50.271	0.406	27.3	77.9041	0.0000	SURCHARGED
15 minute summer	16	1	49.412	0.000	5.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	7.0	0.707	0.176	0.1513	
15 minute summer	2	2.000	3	6.9	1.823	0.155	0.2057	
15 minute summer	3	1.001	4	20.6	1.002	0.517	0.8015	
15 minute summer	4	1.002	5	27.3	0.792	0.386	0.5448	
15 minute summer	5	1.003	6	34.0	0.901	0.481	1.1873	
15 minute summer	6	1.004	8	40.4	1.208	0.572	0.5026	
15 minute summer	7	3.000	8	7.0	2.163	0.124	0.0907	
15 minute summer	8	1.005	12	53.3	1.985	0.338	1.0448	
15 minute summer	9	4.000	10	7.0	0.870	0.303	0.2219	
15 minute summer	10	4.001	11	13.7	0.962	0.595	0.4775	
15 minute summer	11	4.002	12	19.0	1.090	1.164	0.3936	
15 minute summer	12	1.006	13	78.6	1.886	0.446	0.4432	
15 minute summer	13	1.007	14	78.3	1.730	0.542	0.5963	
15 minute winter	14	1.008	15	73.2	2.489	0.506	0.2615	
360 minute summer	15	Hydro-Brake®	16	6.4				148.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.78%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	52.589	0.234	17.1	0.4128	0.0000	SURCHARGED
15 minute summer	2	10	55.664	0.064	17.1	0.1027	0.0000	OK
15 minute summer	3	12	52.573	0.348	48.4	0.6042	0.0000	SURCHARGED
15 minute summer	4	11	52.264	0.344	60.9	0.4832	0.0000	SURCHARGED
15 minute summer	5	11	52.205	0.349	74.5	0.4800	0.0000	SURCHARGED
15 minute summer	6	11	52.039	0.312	88.6	0.4402	0.0000	SURCHARGED
15 minute summer	7	10	55.603	0.058	17.1	0.1039	0.0000	OK
30 minute summer	8	18	51.872	0.206	117.8	0.3009	0.0000	OK
30 minute summer	9	21	52.628	0.761	16.2	1.3685	0.0000	SURCHARGED
30 minute summer	10	21	52.524	1.121	28.7	1.9357	0.0000	SURCHARGED
30 minute summer	11	20	52.034	1.212	34.3	2.1290	0.0000	FLOOD RISK
30 minute summer	12	20	51.201	0.729	161.9	1.2500	0.0000	SURCHARGED
30 minute summer	13	20	50.858	0.651	158.0	0.7366	0.0000	SURCHARGED
360 minute winter	14	296	50.655	0.665	32.8	0.7522	0.0000	SURCHARGED
360 minute winter	15	296	50.655	0.790	39.7	180.7708	0.0000	SURCHARGED
15 minute summer	16	1	49.412	0.000	6.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	15.8	0.748	0.396	0.5810	
15 minute summer	2	2.000	3	17.0	1.825	0.379	0.6523	
15 minute summer	3	1.001	4	44.8	1.173	1.128	1.5529	
15 minute summer	4	1.002	5	58.4	0.876	0.827	1.1126	
15 minute summer	5	1.003	6	72.9	1.084	1.032	2.2182	
15 minute summer	6	1.004	8	88.5	1.528	1.253	0.9138	
15 minute summer	7	3.000	8	17.0	2.761	0.299	0.1720	
30 minute summer	8	1.005	12	117.9	2.321	0.748	2.3242	
30 minute summer	9	4.000	10	14.0	0.959	0.609	0.4861	
30 minute summer	10	4.001	11	21.3	1.210	0.923	0.6087	
30 minute summer	11	4.002	12	32.7	1.860	2.002	0.4141	
30 minute summer	12	1.006	13	158.0	2.244	0.896	0.7476	
30 minute summer	13	1.007	14	157.3	2.234	1.089	0.9078	
360 minute winter	14	1.008	15	39.7	1.358	0.274	0.5203	
360 minute winter	15	Hydro-Brake®	16	6.4				193.1

Results for 100 year +50% CC +5% A Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	1	33	53.771	1.416	25.8	2.5402	0.3558	FLOOD
15 minute summer	2	11	55.707	0.107	33.5	0.1749	0.0000	OK
30 minute summer	3	18	53.717	1.492	93.5	2.6319	11.1945	FLOOD
15 minute summer	4	11	53.648	1.728	78.1	2.4505	0.0000	SURCHARGED
15 minute summer	5	11	53.599	1.743	97.7	2.4178	0.0000	SURCHARGED
15 minute summer	6	11	53.384	1.657	117.9	2.3606	0.0000	SURCHARGED
15 minute summer	7	10	55.630	0.085	33.5	0.1553	0.0000	OK
15 minute summer	8	11	53.157	1.491	176.6	2.2055	0.0000	SURCHARGED
30 minute summer	9	17	53.217	1.350	32.2	2.4719	2.9053	FLOOD
60 minute summer	10	31	52.912	1.509	43.0	2.6513	7.4301	FLOOD
60 minute summer	11	31	52.260	1.438	48.5	2.5711	12.9777	FLOOD
30 minute summer	12	18	52.013	1.541	219.5	2.6875	1.9508	FLOOD
60 minute summer	13	36	51.506	1.299	193.4	1.4697	0.0000	FLOOD RISK
600 minute winter	14	570	51.340	1.350	43.8	1.5267	0.0000	SURCHARGED
600 minute winter	15	570	51.339	1.474	43.6	434.4031	0.0000	SURCHARGED
15 minute summer	16	1	49.412	0.000	6.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	1	1.000	3	24.2	0.691	0.610	0.5810	
15 minute summer	2	2.000	3	32.4	1.935	0.724	0.8189	
30 minute summer	3	1.001	4	56.5	1.420	1.420	1.5529	
15 minute summer	4	1.002	5	74.4	1.056	1.052	1.1126	
15 minute summer	5	1.003	6	93.3	1.324	1.320	2.2182	
15 minute summer	6	1.004	8	112.6	1.599	1.593	1.0563	
15 minute summer	7	3.000	8	34.7	3.204	0.613	0.3818	
15 minute summer	8	1.005	12	172.6	2.451	1.095	2.7393	
30 minute summer	9	4.000	10	17.3	0.981	0.748	0.4861	
60 minute summer	10	4.001	11	22.7	1.292	0.985	0.6087	
60 minute summer	11	4.002	12	28.9	1.642	1.768	0.4141	
30 minute summer	12	1.006	13	206.0	2.925	1.169	0.7476	
60 minute summer	13	1.007	14	193.2	2.743	1.337	0.9078	
600 minute winter	14	1.008	15	43.6	1.348	0.301	0.5203	
600 minute winter	15	Hydro-Brake®	16	6.4				279.8

Appendix 7 - Simple Index Approach (SIA) Tool

SIMPLE INDEX APPROACH: TOOL

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).

2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.

3. The process that is automated in this tool is described in the SuDS Manual, Chapter 26 (Section 26.7)

3. Relevant design examples are included in the SuDS Manual Appendix C.

4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

6. Interception should be delivered for all upstream impermeable areas as part of the strategy for water quantity and quality control for the site. This is required in order to deliver both of the water quality criteria set out in Chapter 4 of the SuDS Manual

	DROP DOWN LIST	**RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP**
	USER ENTRY	**USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL**

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

	Runoff Area Land Use Description	*Pollution Hazard*	*Pollution Hazard Indices* Total Suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable): →	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:					
	Landuse Pollution Hazard Index	**Low**	**0.5**	**0.4**	**0.4**

DESIGN CONDITIONS

1	2

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

	SuDS Component Description	*Pollution Mitigation Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Pervious pavement (where the pavement is not designed as an infiltration component)	0.7	0.6	0.7	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	Detention basin	0.5	0.5	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Detention basins should be designed to ensure the effective retention and management of sediment, such that the sediment will not be re-suspended and washed out in subsequent events	
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	None	0	0	0			
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:							
	Aggregated Surface Water Pollution Mitigation Index	**0.95**	**0.85**	**>0.95**			

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? Go to Step 2B
No ? Go to Step 2C

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

		Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons
Select type of groundwater protection from the drop down list: →	None			
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:				
	Groundwater Protection Pollution Mitigation Index	**0**	**0**	**0**

DESIGN CONDITIONS

1	2	3	4

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area	**0.95**	**0.85**	**>0.95**

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1
Sufficient	Sufficient	Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.

SIMPLE INDEX APPROACH: TOOL

1. The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).

2. The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.

3. The process that is automated in this tool is described in the SuDS Manual, Chapter 26 (Section 26.7)

3. Relevant design examples are included in the SuDS Manual Appendix C.

4. Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

6. Interception should be delivered for all upstream impermeable areas as part of the strategy for water quantity and quality control for the site. This is required in order to deliver both of the water quality criteria set out in Chapter 4 of the SuDS Manual

	DROP DOWN LIST	**RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP**
	USER ENTRY	**USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL**

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index

- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

	Runoff Area Land Use Description	*Pollution Hazard*	*Pollution Hazard Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2
Select land use type from the drop down list (or 'Other' if none applicable): →	Roads (excluding low traffic roads, highly frequented lorry approaches to industrial estates, trunk roads/motorways)	Medium	0.7	0.6	0.7		
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:							
	Landuse Pollution Hazard Index	**Medium**	**0.7**	**0.6**	**0.7**		

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

	SuDS Component Description	*Pollution Mitigation Indices* Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Swale	0.5	0.6	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	Detention basin	0.5	0.5	0.6	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Detention basins should be designed to ensure the effective retention and management of sediment, such that the sediment will not be re-suspended and washed out in subsequent events	
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	None	0	0	0			
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:							
	Aggregated Surface Water Pollution Mitigation Index	**0.75**	**0.85**	**0.9**	Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).		

Is the runoff now discharged to an infiltration component?

Yes ? Go to Step 2B

No ? Go to Step 2C

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

		Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1	2	3	4
Select type of groundwater protection from the drop down list: →	None							
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:								
	Groundwater Protection Pollution Mitigation Index	**0**	**0**	**0**				

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

	Combined Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	
Combined Pollution Mitigation Indices for the Runoff Area	**0.75**	**0.85**	**0.9**	Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at ">0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (ie over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

	Sufficiency of Pollution Mitigation Indices Total Suspended Solids	Metals	Hydrocarbons	*DESIGN CONDITIONS* 1
Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Sufficient	Sufficient	Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see *Chapter 7 The SuDS design process*). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England

Appendix 8 - Lancashire County Council SuDS Proforma

Lancashire County Council

Sustainable Drainage Systems (SuDS)

Pro-Forma

This Pro-forma is endorsed by the North West Regional Flood and Coastal Committee (RFCC), including representatives from Lancashire County Council, as the Lead Local Flood Authority and Highway Authority, and by United Utilities and the Environment Agency

Lancashire County Council
PO Box 100, County Hall, Preston, PR1 0LD

When to use this pro-forma

The pro-forma may be a requirement of Local Planning Policy or the planning validation checklist for any planning application for major development.

The Lead Local Flood Authority expect the pro-forma to be submitted with all planning applications for major development with surface water drainage.

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your Local Planning Authority may have their own version of the pro-forma within policy, supplementary planning documents or validation checklists. Where such lists include alternative or additional requirements, both sets should be adhered to.

Your sustainable drainage system should be designed in accordance with **CIRIA The SuDS Manual C753** and any necessary adoption standards.

How to complete the pro-forma

Blue Box	Instructs or asks you to provide information
Grey Box	States the evidence required which you will need to submit
White Box	These are the boxes the applicant needs to complete in full

1. Complete ALL white boxes

2. Submit this pro-forma to the Local Planning Authority, along with:

- Sustainable Drainage Strategy
- Site Specific Flood Risk Assessment (if required)
- Minimum supporting evidence, as indicated in grey boxes of this pro-forma.

Guidance to support you

The pro-forma should be completed in conjunction with 'Completing your SuDS Pro Forma Guide', found on our website.

The pro-forma can be completed using freely available tools such as **Tools for Sustainable Drainage Systems** or appropriate industry standard surface water management design software.

Section 1. Your Application and Development Details

a) Planning Application

Planning Application Reference *(if available)*	Click or tap here to enter text.
Select the type of planning application you will be submitting	Pre-application ☐ Outline ☒ Full ☐ Hybrid ☐ Reserved matters ☐

b) Development Site

Developer(s) Name	Gladman Developments Ltd
Consultant(s) Name	Enzygo Ltd
Development Address *(including postcode)*	Land west and east of Henthorn Road, Clitheroe, BB7 2SN
Development Grid Reference *(Eastings/Northings)*	372882, 440627
Total Development Site Area (Ha)	7.17
Contributing Area (Ha) of Development ***Note:*** *Consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.*	3.238

Development Type		**State Proposed Number of Units**
Greenfield Site *Site is wholly undeveloped, and a new drainage system will be installed*	☒	115
Previously Developed / Brownfield Site *Site is already developed, and the entirety of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable)*	☐	Click or tap here to enter text.

c) Details about Flood Risk and Sustainable Drainage Design

Please indicate the flood zone that your development is in. Select all that apply. *Based on the Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).*	Flood Zone 1 ☒ Flood Zone 2 ☒ Flood Zone 3a ☒ Flood Zone 3b ☒
What is the surface water risk of the site? Select all that apply. *Based on the Risk of Surface Water Flooding Map.*	High ☒ Medium ☒ Low ☒ Very Low ☒

Have you submitted a Site-Specific Flood Risk Assessment (FRA)? *See separate guidance notes for clarification on when a FRA is required*	Yes ☒ No ☐
Have you submitted a Sustainable Drainage Strategy?	Yes ☒ No ☐
Select the minimum expected lifetime of development *(years)* *Refer to Planning Practice Guidance 'Flood Risk and Coastal Change' Paragraph 006*	100 years ☒ 75 years ☐ Other ☐

d) Multi-functional Benefits and Natural Flood Management

Select the benefits your sustainable drainage proposal will provide	Water quantity ☒ Water quality ☒ Amenity ☒ Biodiversity ☒
Summarise how your sustainable drainage system will provide the above benefits	Use of attenuation basins, permeable paving, swales or rain gardens, and water butts.

Does your sustainable drainage proposal provide multi-functional benefits via SuDS? *Refer to Paragraphs 055 and 059 of the Planning Practice Guidance*	Yes ☒ No ☐
Does your sustainable drainage proposal include measures to reduce the causes and impacts of flooding? *Refer to Paragraphs 059 and 063 of the Planning Practice Guidance*	Yes ☒ No ☐
Has the proposed sustainable drainage system been integrated with other aspects of the development such as open space or green infrastructure?	Yes ☒ No ☐

Do you propose to use natural flood management opportunities on your development? Select all that apply. *Refer to Paragraph 067 of the Planning Practice Guidance*	On-site ☐ Off-site ☐ No ☒
Have you assessed the impact of the proposed natural flood management within the site-specific flood risk assessment?	Yes ☐ No ☐ N/A ☒

Section 2: Impermeable Area and Existing Drainage

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0.00	1.776	1.776
Evidence Required: Plans showing development layout, with existing and proposed impermeable areas.			☐

Are there existing sewers, watercourses, water bodies, flow paths, highway drains, soakaways, filter drains and/or other drainage features on the site?	Yes ☒ No ☐ Don't know ☐
Evidence Required: Plan(s) showing the existing site layout, to include all: • Natural catchments • Watercourses, both open and culverted • Water bodies – e.g. ponds, swales, wetlands etc. • Overland flow routes • Areas at risk of flooding from any source • Infiltration features – e.g. soakaways, filter drains, areas of sand/gravel etc. • Sewers, manholes and outfall locations (where known) • Highway drains, manholes and gullies (where known) Plans should be appropriately labelled with pipe sizes, dimensions and design levels	☒

Drainage Design ***Outline planning applications*** *should be able to demonstrate that a suitable drainage system is achievable.* ***All other type of planning application*** *should provide full details or reference to previous planning application where drainage details have been submitted or approved.*	
Select which design approach you are taking to manage water quantity *(refer to Section 3.3 of The SuDS Manual C753)*	
Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5) • *The attenuated runoff volume for the 1 in 100 year 6 hour event (plus climate change allowance) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha or less* • *The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate* • *The discharge rate for the critical duration 1 in 100 year event (plus climate change allowance) is restricted to the 1 in 100 year greenfield runoff rate*	☐
Approach 2 – Qbar (Technical Standards S6) • *Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the*	☒

critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is the greater.	
Select the hydraulic method used in your calculations *Refer to Table 24.1 of The SuDS Manual*	FEH ReFH2 ☒ FEH Statistical Method ☐ Other (please state) ☐ Click or tap here to enter text.
Evidence Required: Plan(s) showing: • Existing flow routes, catchments, and flood risks • Modified flow routes, catchments, and flood risks • Contributing and impermeable areas • Current (if any) and proposed 'source control' and 'management train' locations of sustainable drainage components (C753 Chapter 7) • Details of drainage ownership • Details of exceedance routes (Technical Standards S9) • Topographic survey • Locations and number of existing and proposed discharge points ***Note:*** *Consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.*	☒

Section 3: Peak Runoff <u>RATES</u>

Technical Standards S2, S3 and S6 (unless S1 applies)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s)
Qbar *(Approach 2)*	Click or tap here to enter text.	21.10	21.10
1 in 1 Year Event *(Approach 1)*	Click or tap here to enter text.	18.40	21.10
1 in 30 Year Event	Click or tap here to enter text.	35.80	21.10
1 in 100 Year Event* *(Approach 1)*	Click or tap here to enter text.	43.90	21.10

** Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. Climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.*

Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified.	☒
Impermeable areas plan, supported by topographical survey confirming positive drainage.	☒
Hydraulic calculations and details of software used.	☒

Section 4: Discharge <u>VOLUME</u>

Technical Standards S4, S5 and S6 (unless S1 applies)

Rainfall Event	Existing Volume (m^3)	Greenfield Volume (m^3)	Proposed Volume (m^3)
1 in 100 Year 6 Hour Event *(Approach 1)*	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)	Yes ☐ No ☐
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified	☐
Methodology used to calculate discharge volume clearly stated and justified.	☐
Hydraulic calculations and details of software used.	☐

Section 5: Storage

Technical Standards S7 and S8

State climate change allowance used (%) *Allowances must be applied when designing SuDS for both the 3.3% (1 in 30-year) and 1% (1 in 100-year) annual exceedance probability events*	3.3% AEP	Click or tap here to enter text.
	1% AEP	50
Have you applied a 10% urban creep allowance in accordance with British Standard BS 8582 / 2013.	Yes ☒ No ☐ N/A ☐	
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒	

State storage volume required (m^3) *(excluding non-void spaces)* *Must include an allowance for climate change and urban creep. Must be consistent with the contributing area used to calculate the runoff rates and volumes.*	1489m3
Have you incorporated interception into your design? *(Refer to Chapter 24 of The SuDS Manual C753)* *Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.*	Yes ☒ No ☐
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☒

Summarise how storage will be provided for the 1 in 30 year event on site (plus climate change and urban creep allowances). *Storage must be designed to ensure that no flooding occurs onsite in a 1 in 30 year event (plus climate change and urban creep allowances) except in areas designated to hold and/or convey water as part of the design* ***and*** *no flooding occurs offsite in a 1 in 100 year (plus climate change and urban creep allowances) event.*	This may be considered at detailed design stage
Summarise how storage will be provided for the 1 in 100 year event on site (plus climate change and urban creep allowances). *Where storage above the 1 in 30 year event (plus climate change and urban creep allowances) is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site*	Conservative basin up to 100-year +CC

Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☒

Section 6: Water Quality Protection

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☐ No ☒
If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters though the mobilisation of contaminants and/or creation of new pollution pathways.	

Confirm the *Pollution Hazard Level* of the proposed development - Select ALL that apply

Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.

Pollution Hazard Level *Tick ALL that apply*		**Surface water run-off from the proposed development will drain from:**
VERY LOW	☒	• Residential roofs
LOW	☒	• Other roofs (typically commercial/industrial roofs) • Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) • Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	• Commercial yard and delivery areas • Non-residential car parking with frequent change (e.g. hospitals, retail) • All roads except low traffic roads and trunk roads/motorways[1]
HIGH	☐	• Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) • Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured • Industrial sites • Trunk roads and motorways[1]

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☒ No ☐
• *If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual C753*	

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐ No ☐

[1] Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

	N/A ☒
• *If the proposed development has a high polluting potential, a detailed risk assessment <u>will</u> be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 180 of the National Planning Policy Framework.* • *If the proposed development has a medium polluting potential, a detailed risk assessment <u>may</u> be required depending on the nature, scale and location of the development.*	

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐ No ☒
If YES, please provide details:	Click or tap here to enter text.

Section 7: Details of your sustainable drainage system

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource) using rainwater harvesting?	Yes ☒ No ☐
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	Water butts at this outline stage

Do your proposals promote source control to manage rainfall close to where it falls? e.g. promoting natural losses through soakage, infiltration and evapotranspiration	Yes ☒ No ☐
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	Permeable paving, rain gardens and/or swales

b) Hierarchy of Drainage Options – Planning Practice Guidance

Method of discharge are set out in order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable, using as many options as possible as high up the hierarchy as you can.

i) Into the ground (infiltration)

Proposed method of surface water discharge		**Is this proposed?**	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☒	
For full / reserved matters applications or outline applications where layout is <u>not</u> a reserved matter			
If YES – Evidence Required		**If NO – Evidence Required**	
☐	On-site ground investigation to demonstrate that the ground <u>is</u> free draining. Including infiltration test results in accordance with the methodology within BRE 365 (2016)	☒	On-site ground investigation to demonstrate that the ground <u>is not</u> free draining. Including infiltration test results in accordance with the methodology within BRE 365 (2016)
	AND		***OR***
☐	Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B *An editable version of this form is available on [Susdrain website.]*	☐	Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality (e.g. a ground water source protection zone).
			OR
		☐	Geotechnical advice from a competent person* which determines that infiltration of

			water to ground would pose an unacceptable risk of geohazards to the site and/or local area. **Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).*
For outline applications where layout is a reserved matter or where an applicant is unable to access a site to conduct site investigations			
If YES – Evidence Required		**If NO – Evidence Required**	
☒	Thorough desk-based ground investigation e.g. a SuDS GeoReport or similar, making the best use of available resources including historical borehole logs and data available from the British Geological Survey	☐	Thorough desk-based ground investigation e.g. a SuDS GeoReport or similar, making the best use of available resources including historical borehole logs and data available from the British Geological Survey
	AND		
☒	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon further site-specific ground investigation e.g. to consider seasonal variations to groundwater.		

ii) To a surface water body

Proposed method of surface water discharge		**Is this proposed?**	
Hierarchy Level 2: To a surface water body *(select type)* ***NOTE:*** *Consent from LLFA or Permit from Environment Agency may be required – refer to guidance*		Yes ☒ No ☐ N/A ☐ Main River ☒ Ordinary Watercourse ☒ Canal ☐ Other water body ☐	
If YES - Evidence Required		**If NO – Evidence Required**	
☒	Surface water body / watercourse survey and report	☐	Plan showing nearby watercourses and waterbodies
	AND		***AND***
☐	*(If the waterbody is off site or privately owned e.g. canal)* – evidence of an agreement with the appropriate landowner(s) to connect to the waterbody, **OR**, for outline applications, a 'plan b' sustainable drainage plan and statement of approach with an alternative discharge point	☐	Statement providing justification in your Sustainable Drainage Strategy ***Note:*** *Where discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary*

			for the applicant to provide evidence to the local planning authority to support their proposed approach.

iii) To a surface water sewer or highway drain

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer or highway drain *(select type)*		Yes ☐ No ☐ N/A ☒ Surface water sewer ☐ Highway drain ☐	
If YES - Evidence Required		**If NO – Evidence Required**	
☐ ☐	Written correspondence from the Water and Sewerage Company / Highway Authority regarding proposed connection. ***AND*** *(If the sewer is off site)* – evidence of an agreement with the appropriate landowner(s) to connect to the sewer, ***OR***, for outline applications, a 'plan b' sustainable drainage plan and statement of approach with an alternative discharge point	☐ ☐	Plan showing nearby sewers and highway drains ***AND*** Statement providing justification in your Sustainable Drainage Strategy

vi) To a Combined Sewer

Proposed method of surface water discharge		Is this proposed?
Hierarchy Level 4: To combined sewer		Yes ☐ No ☒ N/A ☐
If YES - Evidence Required		**If NO – Evidence Required**
☐ ☐	Written correspondence from the Water and Sewerage Company ***AND*** *(If the sewer is off site)* – evidence of an agreement with the appropriate landowner(s) to connect to the sewer	***N/A***

c) Proposed SuDS Component Types

	Tick ALL that apply					
Within property boundary	☐ Rainwater harvesting	☐ Green/ blue roofs	☒ Pervious pavements *[**Type:** A ☐ B ☐ C ☐]*	☐ Soakaway	☐ Bio retention systems	☒ Water Butt

	Tick ALL that apply				
Within development site boundary *(not property)*	☐ Wetlands	☐ Infiltration basins	☒ Rain gardens	☐ Bio retention system	☒ Detention basins
	☐ Retention ponds	☒ Swales	☐ Filter strips, channels and rills	☐ Infiltration trenches	☐ Other (state below)
	If 'Other' please state: Click or tap here to enter text.				

Off site *(not within the boundary of the proposed development)*	**Please state:** Click or tap here to enter text.

I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☒
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year (plus climate change and urban creep allowances) rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☒

Section 8: Operation and Maintenance

Technical Standard S12 and National Planning Policy Framework

The applicant is responsible to ensure that ALL components selected in Section 7 can be maintained for the design life of the development. This information is required so the Local Planning Authority can ensure the maintenance and management of the sustainable drainage system. The Local Planning Authority will discuss how this will be secured (e.g. via planning condition or planning obligation).

Will any part of your sustainable drainage system use monitoring and operation technology?	Yes ☐ No ☒
Evidence Required: Please state what technology you propose to use and where we can find more details in your documents.	Click or tap here to enter text.

	Information Provided?
Management Plan	Yes ☒ No ☐
Evidence Required: **Plan/ drawing provided to show the position of the different SuDS components with:** • Key included to identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption *(relates to maintenance and management arrangements below).* • Plan/ drawing to identify any areas where certain activities are prohibited, detailing reasons why.	☒
Action plan for accidental pollutant spillages.	☐

	Information Provided?
Maintenance Schedule	Yes ☒ No ☐
Evidence Required: A copy of the maintenance schedule including both: • **Proactive and preventative maintenance** Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. • **Reactive and corrective maintenance** (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures.	☒

Maintenance and Management Arrangements	Information Provided? Yes ☒ No ☐
Evidence Required: Evidence of formal agreement with the party responsible for undertaking maintenance. Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply. ☐ **Water and Sewerage Company** *Section 104 agreement (Water Industry Act 1991)* ☐ **Highway Authority** *Section 278/38 agreement (Highways Act 1980)* ☐ **Local Authority Public Open Space** *[Refer to Local Authority Policy]* Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply. ☒ **Management Company** ☐ **Property Owner** *(for SuDS components within property boundary only)* ☐ **Other** (please state) Click or tap here to enter text.	☐

Your Evidence

Please list any relevant documents and or drawing numbers (including revision reference) to support your answers in this pro-forma.
Click or tap here to enter text.

Declaration and Submission

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details

Completed by	Daniel Alstead		
Authorised by	Daniel Alstead		
Date *(dd/mm/yyyy)*	18th December	**Company Name**	Enzygo Ltd

Client Details

Name	Daniel Alstead	**Company Name**	Enzygo Ltd

Enzygo specialise in a wide range of technical services:

- Property and Sites
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