

DRAINAGE STRATEGY REPORT

PROPOSED RESIDENTIAL DEVELOPMENT Hillbank Street Middleton Rochdale M24 2RB

Author: Daniel Slattery
Client: Harrison Construction Ltd
Doc Ref: rep-tjba-HCL-hillbank st-DSR-031225.docx

Revision	Date	Reason
0	Dec 2025	Original to address planning condition.

T J Booth Associates.
20A Eastgate St,
Rochdale,
Lancs,
OL16 1DH.
Tel: 01706 868288.
Email: office@tjba.co.uk



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1 Introduction.

1.1 Purpose of Assessment.

To ensure drainage strategy from the proposed development is in accordance with standard guidance.

The Site will be assessed in accordance with the national drainage hierarchy for surface water disposal & exceedance characteristics, also considering the proposed end adopters and their requirements.

Regarding Site assessment, this report will appraise the existing and local drainage infrastructure, assess the suitability of the proposed development, giving recommendations for drainage design & management, specifically for approval of the LLFA/EA/sewerage undertakers, as applicable.

Drainage from new developments is to be designed to follow the national drainage hierarchy for surface water discharge to the following networks in order of preference:

- infiltration.
- Watercourse.
- surface water sewer.
- combined sewer.

Flow rates (existing & proposed) are to be estimated for approval using the following methodology:

- Development should aim to deliver greenfield runoff on greenfield sites up to a 100yr rainfall event, considering climate change.
- Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites on a 1yr rainfall event.
- Development should be designed so that there is no flooding to the development in a 30yr event, and so that there is no property flooding in a 100yr event considering climate change.

2 Site Proposals.

See Location Plan in Appendix showing the area features.

The application is for the development of 3No. detached dwellings on a plot of land at the end of Hillbank Street.

The dwellings will share an access road, with driveways to the front and soft landscaped gardens to the front/rear. Each dwelling will have a garage.

The access road is through two blocks of housing fronted onto Rochdale Road, which opens up to a nominally rectangular plot of land.

Refer to Proposed Plan in appendix.

2.1 Derivation of Data, Surveys and Models.

2.1.1 Existing and proposed topography.

A topographic survey has previously been undertaken.

Relating to the rectangular plot, the survey recorded the following levels in maOD:

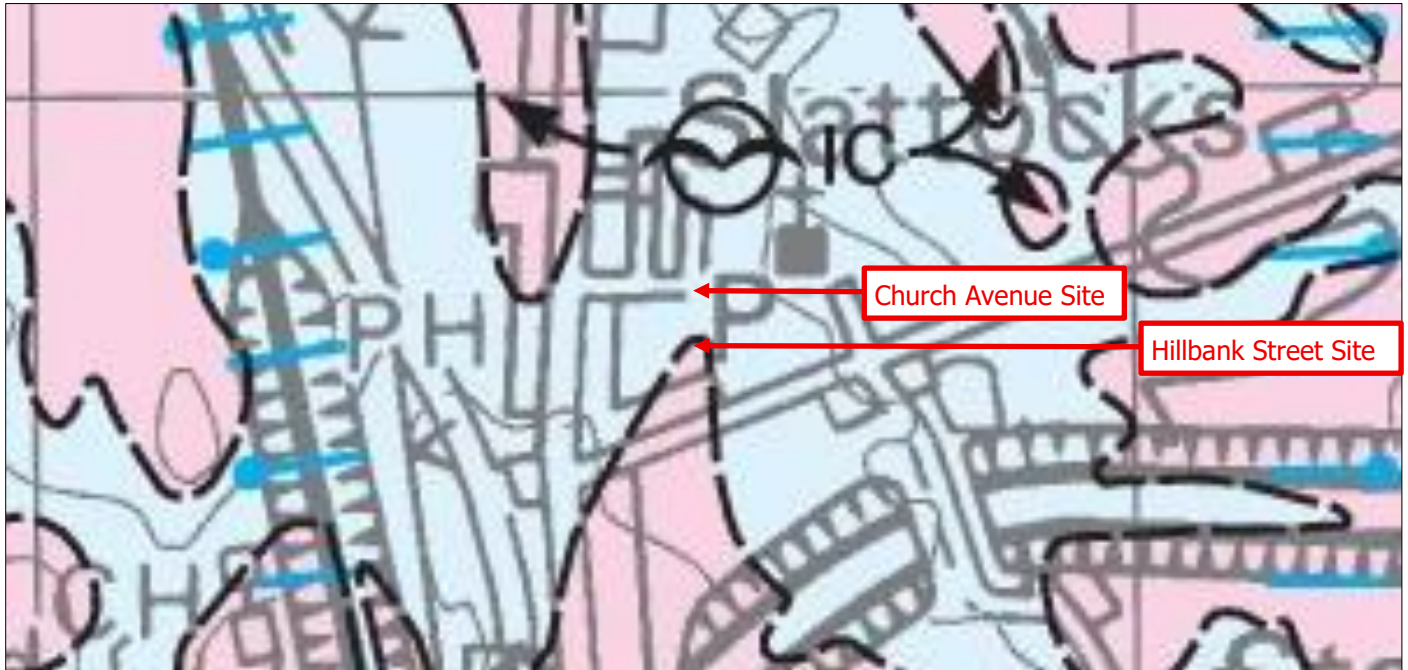
Northwest corner:	c132.25m aOD
Northeast corner:	c132.20m aOD
Southeast corner:	c132.00m aOD
Southwest corner:	c132.00m aOD

2.1.2 Geology.

BGS maps shows the Hillbank Street site to be in an area where glaciofluvial sands & gravels encroach from the south and onto the site. The area to the north of the site including Church Street is made up of glacial clay.

Sand & gravel deposits are laid down by glacial processes generally incised into and on top of the glacial clay base.

Refer to BGS map below:

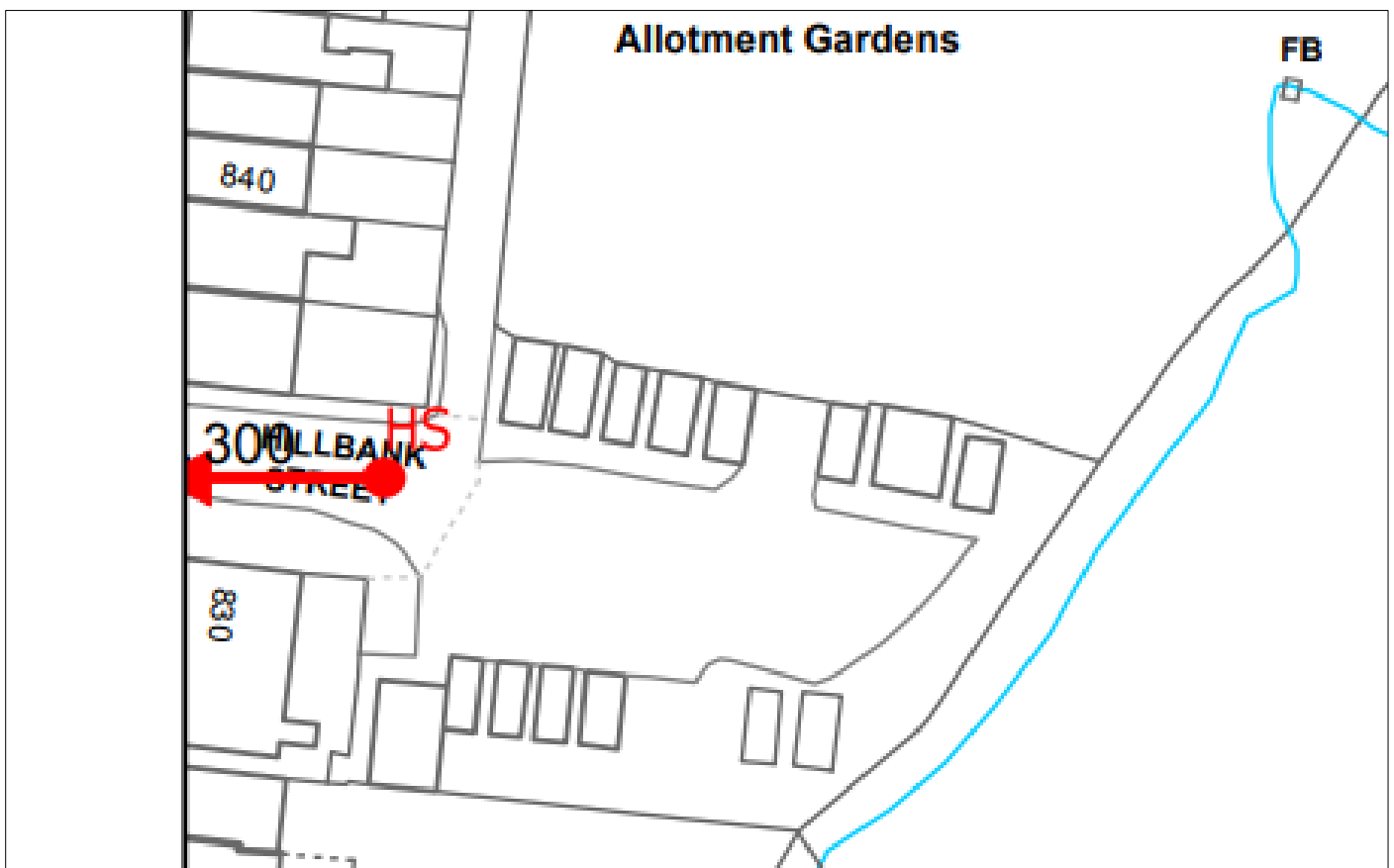


2.1.3 Drainage Surveys.

No previous onsite drainage.

No survey undertaken.

2.1.4 Sewer Undertaker Records.



There is a 300dia combined within the access road to the Hillbank St site.

2.1.5 Site Investigation & Soakaway Test.

Site investigations undertaken 14.08.2024 revealed glaciofluvial SANDS on the Hillbank Street site, refer to separate report ref: rep-tjba-harrison-hillbank st-phs1_2_3env-rev0; and trial hole logs in the Appendix.

A further trial hole (TH5) was excavated for the purposes of infiltration testing, and the following strata was recorded:

TH5 GL: 131.95m aOD

0 – 150	MOT & hardcore MADE GROUND.
150 – 500	Dark brown/black sandy gravelly silty clay MADE GROUND. Gravel is fine brick, coal, slate, ash.
500 – 800	Medium dense orange/brown silty SAND.
800 – 1100	Medium dense light brown fine SAND.
1100 – 1300	Medium dense light grey fine SAND.

Soakaway test results were calculated to obtain an infiltration rate coefficient for the subsoils, refer to calculation in the Appendix.

The infiltration rate of 2.0×10^{-5} m/s is suitable for the disposal of surface water to ground, and will be adopted in the site proposals.

3 Drainage Strategy.

3.1 Existing Site rainfall & drainage systems.

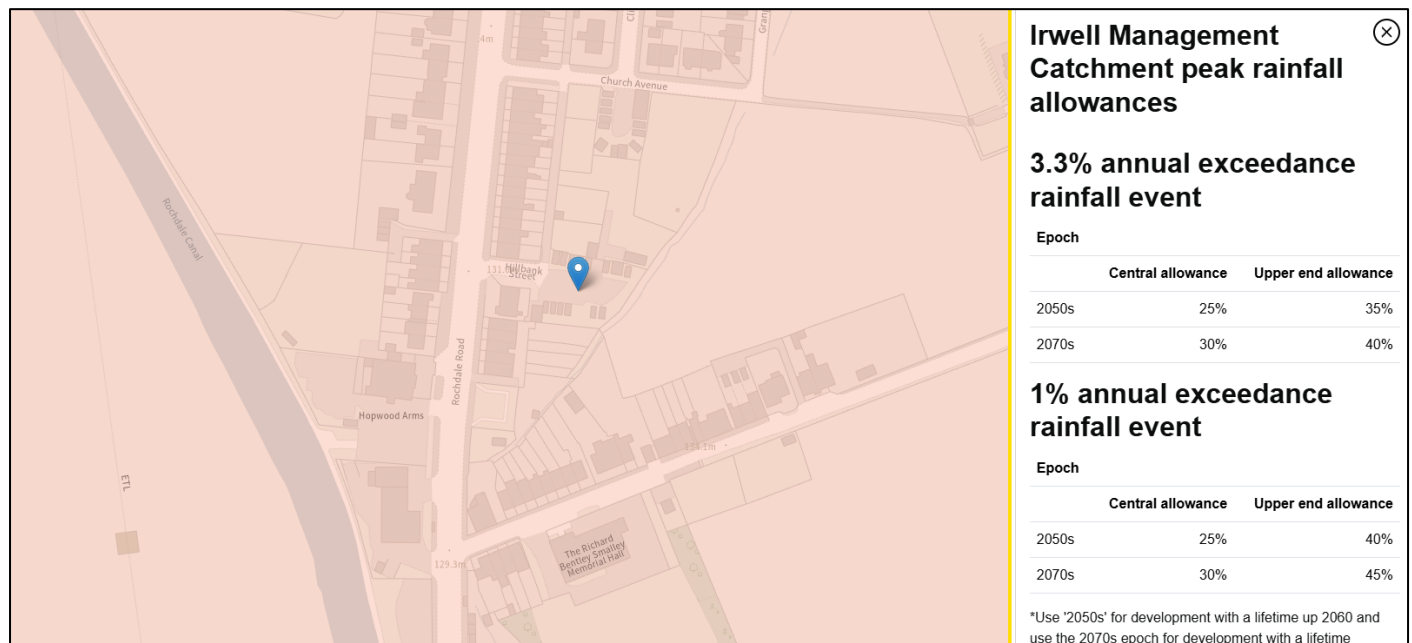
The site is considered greenfield for the purposes of the assessment.

Local rainfall characteristics are as follows:

M5-60 rainfall depth (mm)	20
'r' ratio M5-60 / M5-2day	0.3
FEH/FSR conversion factor	1.12
Hydrological region	10

3.2 Rainfall Climate Change Impacts.

Climate change allowances to peak rainfall intensity are given nationally across the whole of England, based upon river management catchment areas. Refer to graphic inset:



Given the proposed residential end use, the 2070s epoch is considered suitable for climate change estimation cross referenced with the upper end allowance potential; which suggests the following climate change estimations to be used:

30yr rainfalls +40% climate change allowance.

100yr rainfalls +45% climate change allowance.

3.3 Proposed Surface Water Drainage.

3.3.1 Infiltration.

Infiltration tests have been undertaken and found to be suitable for the disposal of surface water from the site.

The site is to comprises 3 identical soakaways of 1200dia ring, porous granular surround. The soakaways are to serve identical roof areas.

The Microdrainage calculations in the Appendix are for a single soakaway.

All exterior patios, pathways, and access roads are to comprise permeable paving.

Refer to separate drainage plan, ref: dwg-tjba-HCL-hillbank st-drainage plan & details-rev0.

3.3.2 Watercourse.

There is a small watercourse to the east of the site, but connection is not required.

3.3.3 SW Sewer.

No surface water sewers identified in the local area, and connection is not required.

3.3.4 Combined Sewer.

Connection is not required for surface water.

3.4 Proposed Foul Water Drainage.

It is proposed to connect only the proposed foul drainage to the 300dia combined UU network in the Hillbank Street access road.

3.5 Adoption.

The drainage systems drainage will remain private.

3.6 Maintenance.

Maintenance of suds will be private.

4 Conclusion & Residual risks.

This report should be suitable for LPA & UU approval.

Signed.....  .

D.S. Slattery BSc (Hons).

T J Booth Associates.

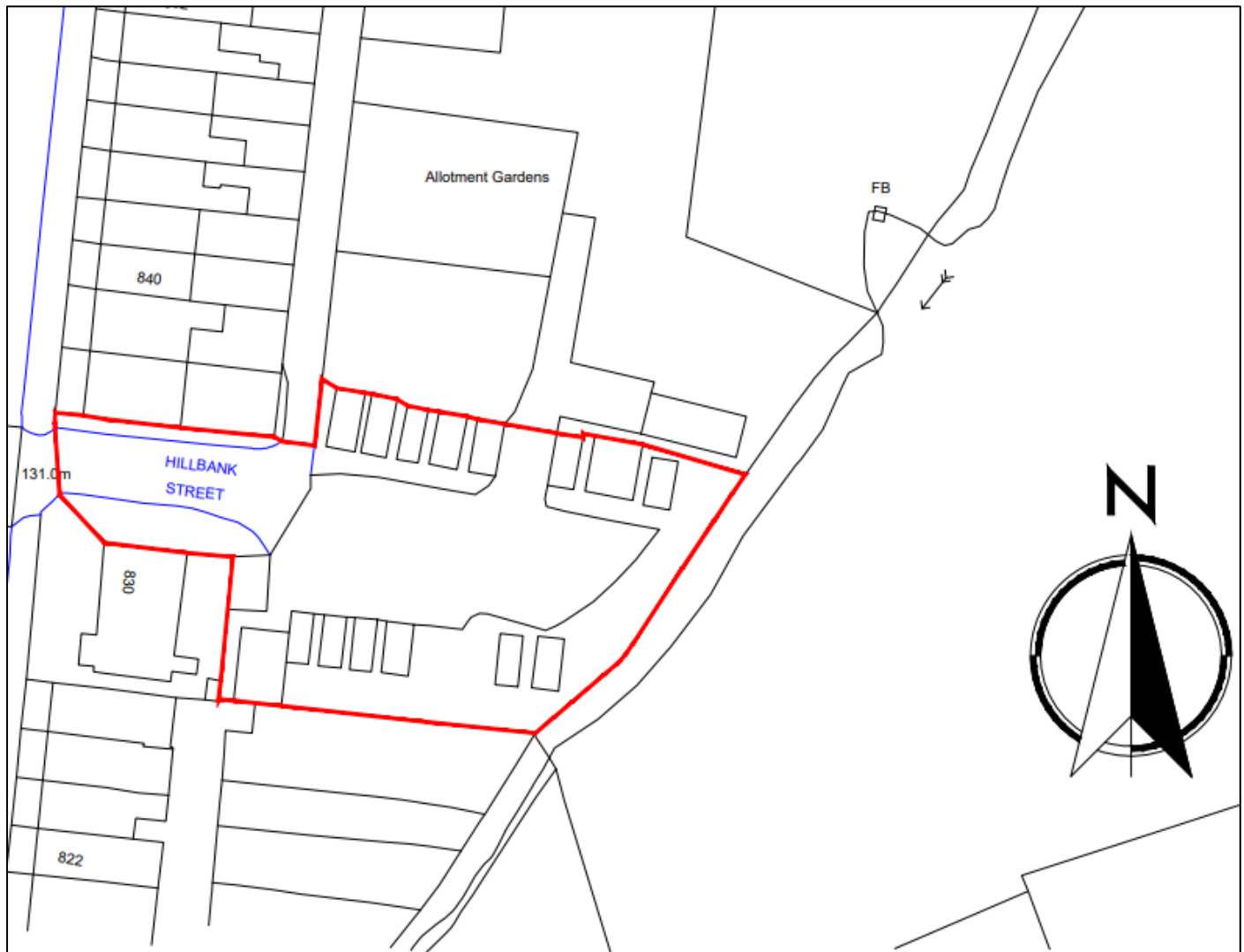
Authorised...  .

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

T J Booth Associates.

5 Appendix.

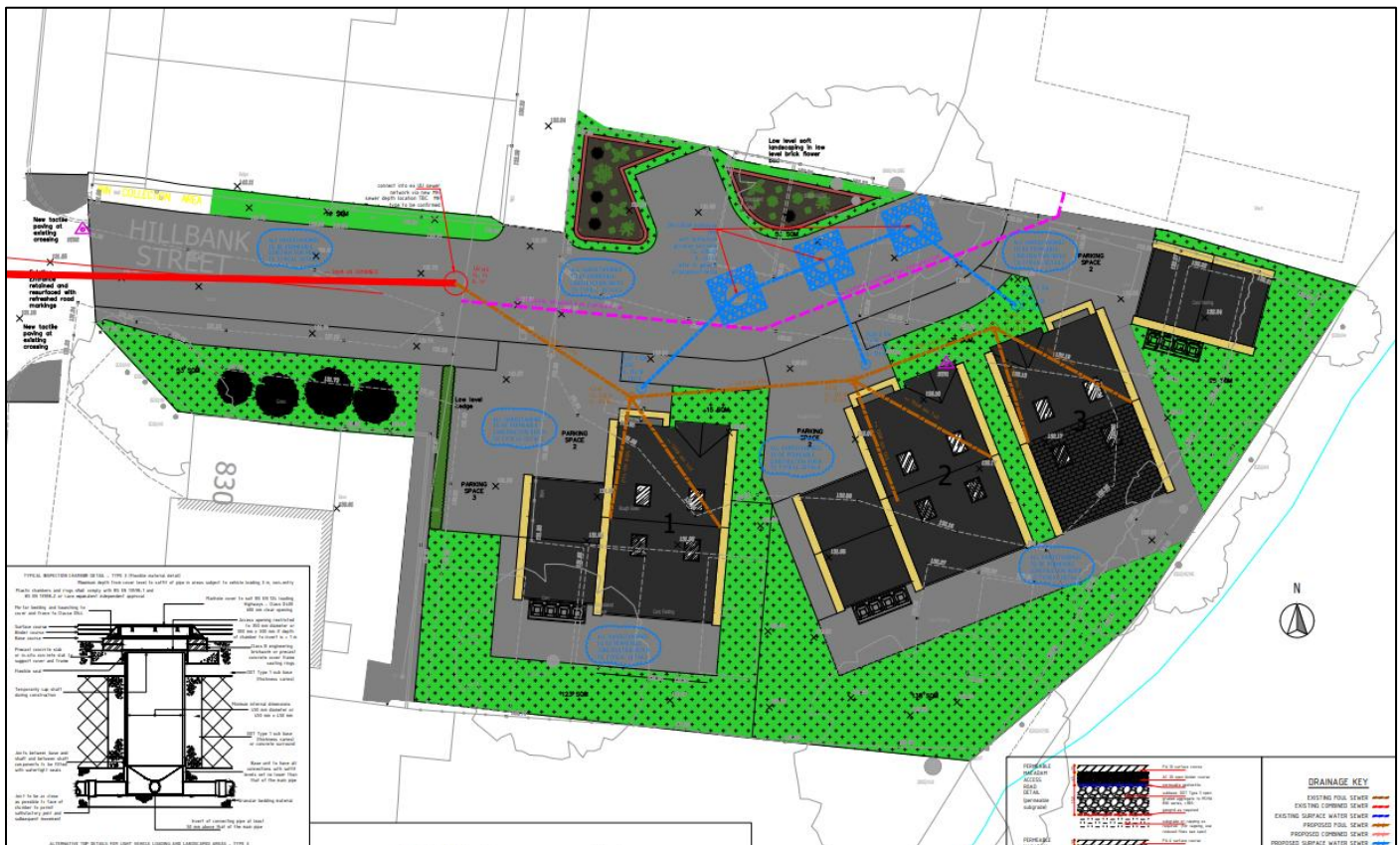
5.1 Location Plan.



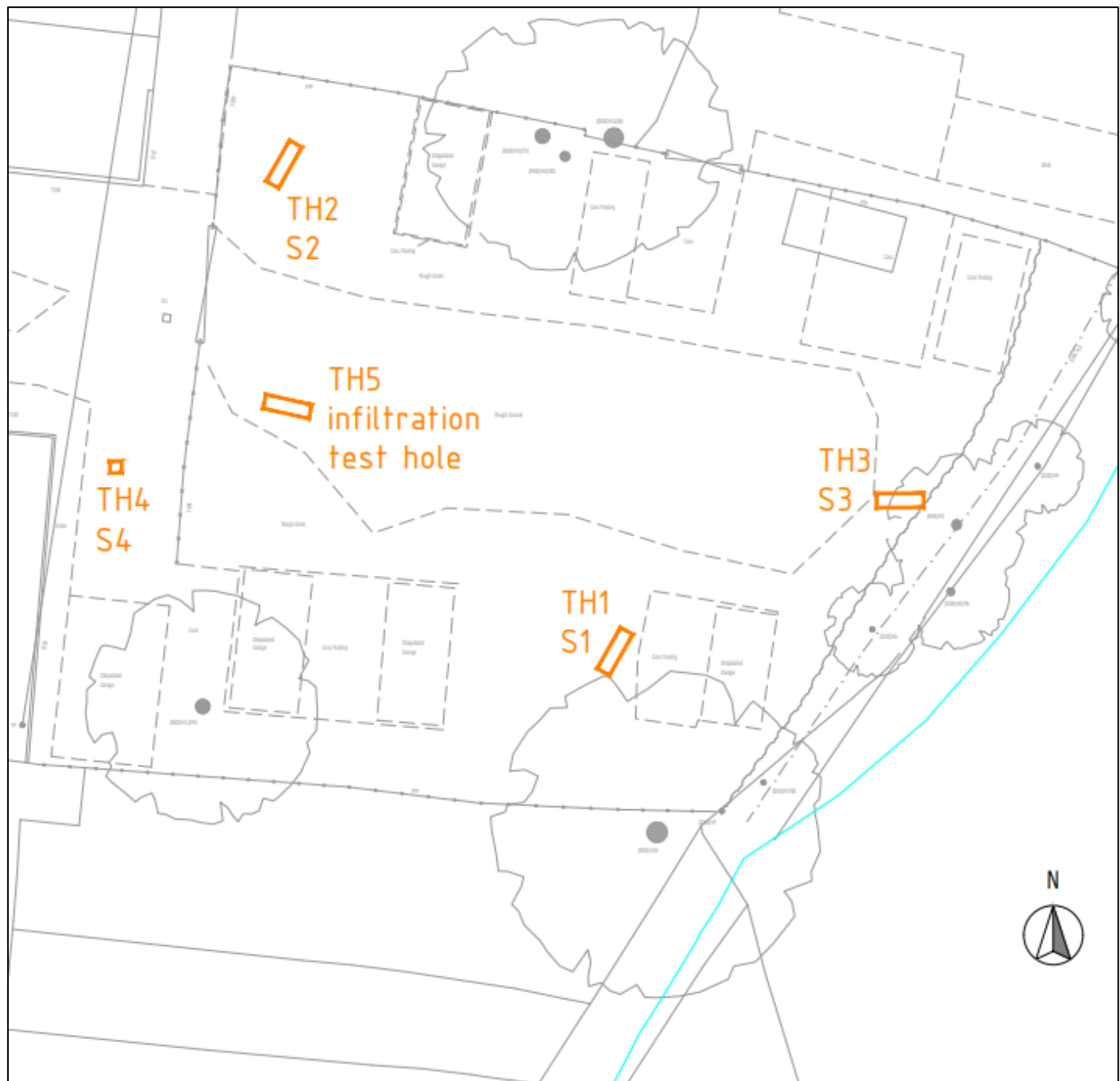
5.2 Proposed Site Plan.



5.3 Proposed Drainage Plan (Excerpt).



5.4 Trial Hole Plan & Logs.



SITE INVESTIGATION NOTES:

THs1-4 trial holes tjba 27.08.2024
 S1-4 soil samples tjba 27.08.2024
 TH5 trial hole/infiltration test tjba 27.06.2025

T J BOOTH ASSOCIATES 20A Eastgate Street
 Rochdale
 Lancashire
 OL16 1DH
 Tel:01706 868288

CONSULTING CIVIL & GEOTECHNICAL ENGINEERS

Harrison Construction Ltd / Hillbank St, Middleton

SITE INVESTIGATION PLAN

AMENDMENTS/ ISSUES			
1	SW infiltration test hole TH5	jun 2025	ds
0	original	aug 2024	ds
REVISION	REASON/ CHANGE	DATE	BY

FILE NAME: dwg-tjba-hillbank st & church ave-170725

SCALE: 1 : 250 @ A4

TRIAL PIT LOG

Trial pit reference TH1

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.40	X x X x x X x X X x X x	(0.60) 0.60	MADE GROUND: dark brown/black silty SAND & GRAVEL. Gravel is brick, stone, concrete, ash, slate/conc/clay tile, asbestos sheet & rare plastic. (S1)
	98.90	: : : : : : : : :	(0.50) 1.10	Medium dense light brown SAND
	98.50	X - X - - X - X -	(0.40) 1.50	Medium dense light brown-pink very clayey SAND & GRAVEL
	98.10	X X X X	(0.40) 1.90	Medium dense light brown-pink SAND & GRAVEL
				Trial pit ends

Not shown to scale

Additional notes: No groundwater.



TRIAL PIT LOG

Trial pit reference TH2

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.75	X X X X	(0.25) 0.25	MADE GROUND: dark brown slightly sandy slightly gravelly SILT. Gravel is brick, stone, concrete, slate, rare coal & ash. (S2)
	99.60	: : :	0.40	Medium dense light brown fine SAND
	98.90	X X X X X X X X	(0.70) 1.10	Medium dense light brown-pink occasionally clayey SAND & GRAVEL
	97.80	: : : : : : : : : : : : : : : : : :	(1.10) 2.20	Medium dense orange-pink medium SAND
				Trial pit ends

Not shown to scale

Additional notes: No groundwater.



TRIAL PIT LOG

Trial pit reference TH3

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.60	X o X o o X o X	(0.40) 0.40	MADE GROUND: dark brown/black very gravelly SILT. Gravel is ash, brick, stone, slate. (S3)
	99.15	: - : - : - : - - : - : - : - : : - : - : - : -	(0.45) 0.85	Medium dense light brown very clayey fine SAND
	98.70	: o : o : o : o : o : o : o :	(0.45) 1.30	Medium dense light brown-pink occasionally clayey SAND AND GRAVEL
	97.90	: : : : : : : : : : : :	(0.80) 2.10	Medium dense orange-pink medium SAND
				Trial pit ends

Not shown to scale

Additional notes: No groundwater.



TRIAL PIT LOG

Trial pit reference TH4

Sheet 1 of 1

Water	Reduced Level (m)	Legend	Depth (m)	Description
	100.00			
	99.60	X X X X	(0.40) 0.40	MADE GROUND: dark brown slightly sandy slightly gravelly SILT. Gravel is fine fragments of brick, coal & slate. (S4)
				Trial pit ends

Not shown to scale

Additional notes: No groundwater.

5.5 Infiltration Calculations.**soakaway test**

as per BRE Digest 365

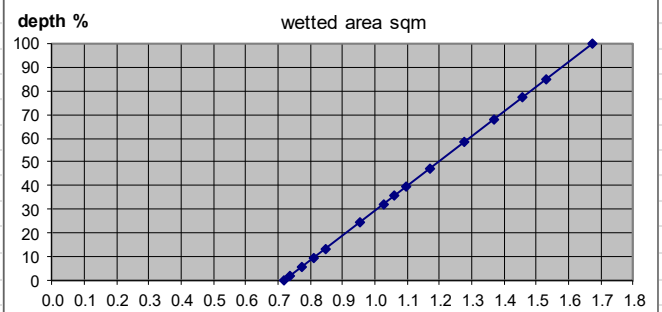
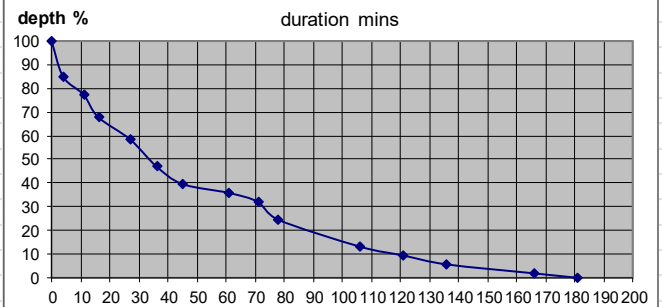
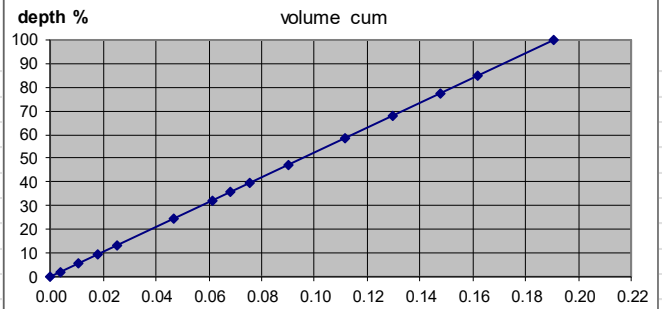
client Harrison Construction
project Hillbank Street
locn TH5
date 27.06.2025

provide a clean vertical sided pit or trench

pit length	1.2 m
pit width	0.6 m
pit depth b GL	1.3 m
pit equiv dia	0.2 m
pit base area	0.72 sqm

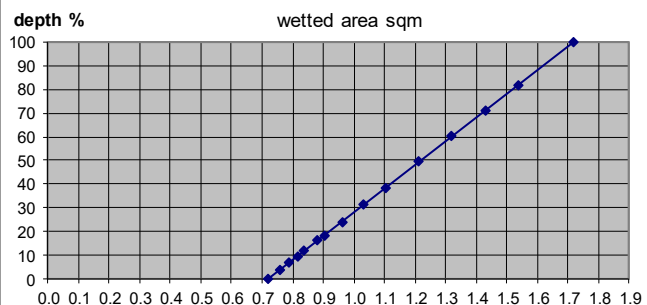
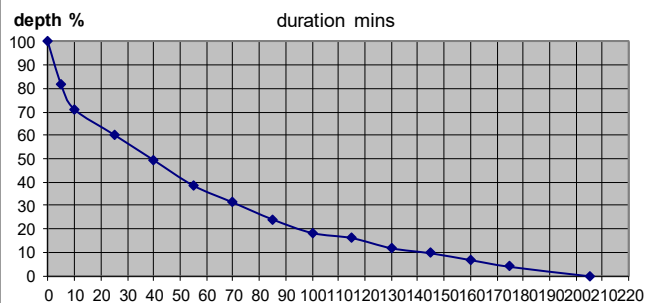
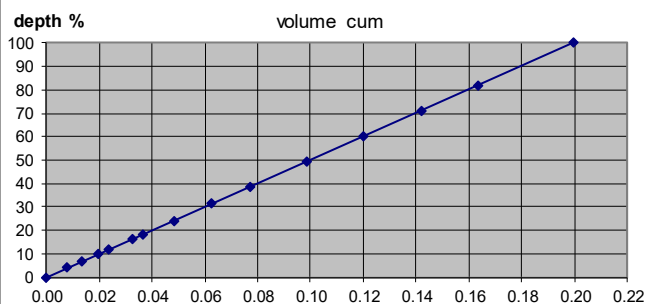
TEST	DATE	INFILTRATION RATE	
		m/s	m/hr
TEST 1	23rd oct 07	2.0E-05	7.1E-02
TEST 2	24th oct 07	1.9E-05	6.7E-02
TEST 3	25th oct 07	2.1E-05	7.4E-02
Design infiltration rate		2.0E-05	7.1E-02

test 1		23rd oct 07						
time		duration	depth from GL	depth from base	depth from wt	% depth	wetted area	volume
hr	min	mins	m	m	m		sqm	cum
10	44	0	0.76	0.54	0.265	100	1.7	0.19
10	48	4	0.8	0.5	0.225	85	1.5	0.16
10	55	11	0.82	0.48	0.205	77	1.5	0.15
11	0	16	0.845	0.455	0.18	68	1.4	0.13
11	11	27	0.87	0.43	0.155	58	1.3	0.11
11	20	36	0.9	0.4	0.125	47	1.2	0.09
11	29	45	0.92	0.38	0.105	40	1.1	0.08
11	45	61	0.93	0.37	0.095	36	1.1	0.07
11	55	71	0.94	0.36	0.085	32	1.0	0.06
12	2	78	0.96	0.34	0.065	25	1.0	0.05
12	30	106	0.99	0.31	0.035	13	0.8	0.03
12	45	121	1	0.3	0.025	9	0.8	0.02
13	0	136	1.01	0.29	0.015	6	0.8	0.01
13	30	166	1.02	0.28	0.005	2	0.7	0.00
13	45	181	1.025	0.275	0	0	0.7	0.00



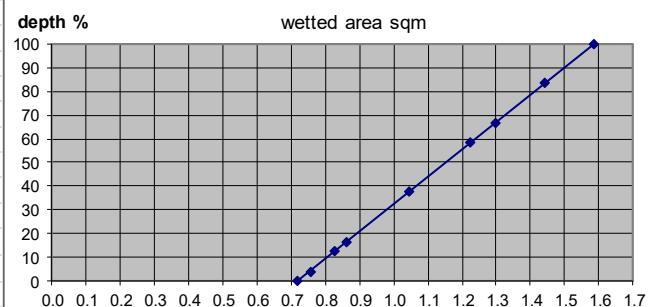
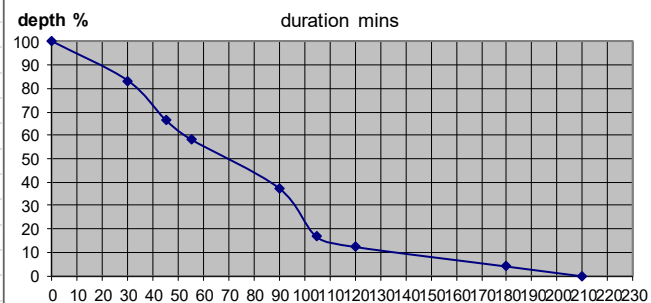
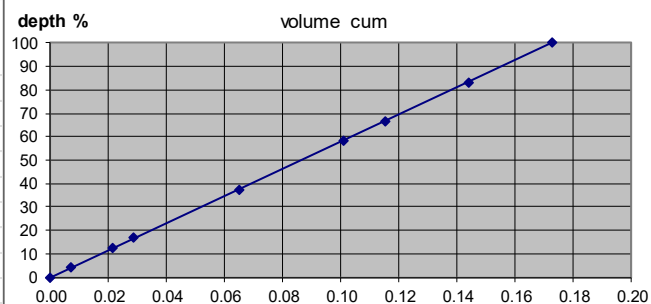
volume @ 75% depth	V75	0.14	cu m
volume @ 25% depth	V25	0.05	cu m
time @ 75% depth	t75	12	mins
time @ 25% depth	t25	75	mins
pit surface area @ 50% depth	Ap50	1.2	sq m
infiltration rate	f	2.0E-05	m/s

test 2		24th oct 07								
time		duration	depth from GL	depth from base	depth from wt	% depth	wetted area	volume		
hr	min	mins	m	m	m		sqm	cum		
13	5	0	0.8	0.5	0.277	100	1.7	0.20		
13	10	5	0.85	0.45	0.227	82	1.5	0.16		
13	15	10	0.88	0.42	0.197	71	1.4	0.14		
13	30	25	0.91	0.39	0.167	60	1.3	0.12		
13	45	40	0.94	0.36	0.137	49	1.2	0.10		
14	0	55	0.97	0.33	0.107	39	1.1	0.08		
14	15	70	0.99	0.31	0.087	31	1.0	0.06		
14	30	85	1.01	0.29	0.067	24	1.0	0.05		
14	45	100	1.026	0.274	0.051	18	0.9	0.04		
15	0	115	1.032	0.268	0.045	16	0.9	0.03		
15	15	130	1.044	0.256	0.033	12	0.8	0.02		
15	30	145	1.05	0.25	0.027	10	0.8	0.02		
15	45	160	1.058	0.242	0.019	7	0.8	0.01		
16	0	175	1.066	0.234	0.011	4	0.8	0.01		
16	30	205	1.077	0.223	0	0	0.7	0.00		



volume @ 75% depth	V75	0.15	cu m
volume @ 25% depth	V25	0.045	cu m
time @ 75% depth	t75	7.5	mins
time @ 25% depth	t25	85	mins
pit surface area @ 50% depth	Ap50	1.22	sq m
infiltration rate	f	1.9E-05	m/s

test 3		25th oct 07							
		duration	depth from GL	depth from base	depth from wt	% depth	wetted area	volume	
hr	min	mins	m	m	m		sqm	cum	
17	0	0	0.75	0.55	0.24	100	1.6	0.17	
17	30	30	0.79	0.51	0.2	83	1.4	0.14	
17	45	45	0.83	0.47	0.16	67	1.3	0.12	
17	55	55	0.85	0.45	0.14	58	1.2	0.10	
18	30	90	0.9	0.4	0.09	38	1.0	0.06	
18	45	105	0.95	0.35	0.04	17	0.9	0.03	
19	0	120	0.96	0.34	0.03	13	0.8	0.02	
20	0	180	0.98	0.32	0.01	4	0.8	0.01	
20	30	210	0.99	0.31	0	0	0.7	0.00	



volume @ 75% depth	V75	0.13	cu m
volume @ 25% depth	V25	0.045	cu m
time @ 75% depth	t75	37.5	mins
time @ 25% depth	t25	97.5	mins
pit surface area @ 50% depth	Ap50	1.15	sq m
infiltration rate	f	2.1E-05	m/s

5.6 Microdrainage Calculations (Individual Soakaway).

T J Booth Associates				Page 1		
104 Yorkshire St Rochdale Lancashire OL16 1JY		SW soakaway (individual) harrison hillbank st castleton				
Date aug 2025		Designed By DS				
File calc-tjba-harrison-hillbank st-SW att...		Checked By				
Micro Drainage		Source Control W.10.4				
<u>Summary of Results for 1 year Return Period</u> Half Drain Time : 108 minutes						
Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	0.1	0.1	130.6152	0.1153	0.4	O K
30 Summer	0.1	0.1	130.6497	0.1497	0.6	O K
60 Summer	0.1	0.1	130.6823	0.1822	0.7	O K
120 Summer	0.1	0.1	130.7072	0.2072	0.8	O K
180 Summer	0.1	0.1	130.7182	0.2182	0.8	O K
240 Summer	0.1	0.1	130.7222	0.2222	0.8	O K
360 Summer	0.1	0.1	130.7207	0.2207	0.8	O K
480 Summer	0.1	0.1	130.7153	0.2152	0.8	O K
600 Summer	0.1	0.1	130.7072	0.2072	0.8	O K
720 Summer	0.1	0.1	130.6992	0.1992	0.7	O K
960 Summer	0.1	0.1	130.6823	0.1822	0.7	O K
1440 Summer	0.1	0.1	130.6492	0.1493	0.6	O K
2160 Summer	0.1	0.1	130.6087	0.1088	0.4	O K
2880 Summer	0.1	0.1	130.5793	0.0793	0.3	O K
4320 Summer	0.1	0.1	130.5497	0.0497	0.2	O K
5760 Summer	0.1	0.1	130.5417	0.0417	0.2	O K
7200 Summer	0.0	0.0	130.5363	0.0362	0.1	O K
8640 Summer	0.0	0.0	130.5323	0.0322	0.1	O K
10080 Summer	0.0	0.0	130.5293	0.0292	0.1	O K
15 Winter	0.1	0.1	130.6302	0.1303	0.5	O K
30 Winter	0.1	0.1	130.6698	0.1697	0.6	O K
60 Winter	0.1	0.1	130.7083	0.2082	0.8	O K
120 Winter	0.1	0.1	130.7368	0.2367	0.9	O K
180 Winter	0.1	0.1	130.7482	0.2482	0.9	O K
Storm Duration (mins)	Rain (mm/hr)		Time-Peak (mins)			
15 Summer	28.17		18			
30 Summer	19.18		32			
60 Summer	12.80		60			
120 Summer	8.41		96			
180 Summer	6.56		130			
240 Summer	5.47		164			
360 Summer	4.21		234			
480 Summer	3.50		304			
600 Summer	3.03		372			
720 Summer	2.70		440			
960 Summer	2.25		570			
1440 Summer	1.73		822			
2160 Summer	1.33		1188			
2880 Summer	1.11		1528			
4320 Summer	0.85		2204			
5760 Summer	0.71		2936			
7200 Summer	0.61		3672			
8640 Summer	0.54		4400			
10080 Summer	0.49		5112			
15 Winter	28.17		17			
30 Winter	19.18		31			
60 Winter	12.80		60			
120 Winter	8.41		102			
180 Winter	6.56		140			
(c)1982-2006 Micro Drainage						

T J Booth Associates		Page 2
104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
Date aug 2025 File calc-tjba-harrison-hillbank st-SW att...	Designed By DS Checked By	
Micro Drainage	Source Control W.10.4	

Summary of Results for 1 year Return Period

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
240 Winter	0.1	0.1	130.7507	0.2507	0.9	O K
360 Winter	0.1	0.1	130.7437	0.2437	0.9	O K
480 Winter	0.1	0.1	130.7318	0.2317	0.9	O K
600 Winter	0.1	0.1	130.7173	0.2172	0.8	O K
720 Winter	0.1	0.1	130.7027	0.2027	0.8	O K
960 Winter	0.1	0.1	130.6743	0.1742	0.6	O K
1440 Winter	0.1	0.1	130.6228	0.1228	0.5	O K
2160 Winter	0.1	0.1	130.5683	0.0683	0.3	O K
2880 Winter	0.1	0.1	130.5473	0.0472	0.2	O K
4320 Winter	0.0	0.0	130.5367	0.0367	0.1	O K
5760 Winter	0.0	0.0	130.5302	0.0302	0.1	O K
7200 Winter	0.0	0.0	130.5262	0.0262	0.1	O K
8640 Winter	0.0	0.0	130.5233	0.0232	0.1	O K
10080 Winter	0.0	0.0	130.5213	0.0212	0.1	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	5.47	178
360 Winter	4.21	254
480 Winter	3.50	328
600 Winter	3.03	400
720 Winter	2.70	470
960 Winter	2.25	606
1440 Winter	1.73	854
2160 Winter	1.33	1192
2880 Winter	1.11	1476
4320 Winter	0.85	2200
5760 Winter	0.71	2944
7200 Winter	0.61	3672
8640 Winter	0.54	4408
10080 Winter	0.49	5040

T J Booth Associates		Page 3
104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
Date aug 2025 File calc-tjba-harrison-hillbank st-SW att...	Designed By DS Checked By	
Micro Drainage	Source Control W.10.4	

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	1	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+0
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.009

Time (mins)		Area
from:	to:	(ha)
0	4	0.009

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104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
Date aug 2025	Designed By DS	
File calc-tjba-harrison-hillbank st-SW att...	Checked By	
Micro Drainage	Source Control W.10.4	

Lined Soakaway Details

Infil Coef - Base (m/hr)	0.071000	Pit Multiplier	2.0
Infil Coef - Sides (m/hr)	0.071000	Number Required	1
Safety Factor	2.0	Invert Level (m)	130.500
Porosity	0.56	Cover Level (m)	132.000
Ring Diameter (m)	1.2		

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104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
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Micro Drainage		Source Control W.10.4

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 244 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
15 Summer	0.1	0.1	130.9182	0.4182	1.6	O K
30 Summer	0.1	0.1	131.0578	0.5577	2.1	O K
60 Summer	0.1	0.1	131.1973	0.6973	2.6	O K
120 Summer	0.1	0.1	131.3113	0.8113	3.0	O K
180 Summer	0.1	0.1	131.3473	0.8473	3.2	O K
240 Summer	0.1	0.1	131.3638	0.8638	3.2	O K
360 Summer	0.1	0.1	131.3768	0.8768	3.3	O K
480 Summer	0.1	0.1	131.3738	0.8738	3.3	O K
600 Summer	0.1	0.1	131.3628	0.8628	3.2	O K
720 Summer	0.1	0.1	131.3478	0.8478	3.2	O K
960 Summer	0.1	0.1	131.3138	0.8138	3.0	O K
1440 Summer	0.1	0.1	131.2448	0.7448	2.8	O K
2160 Summer	0.1	0.1	131.1483	0.6483	2.4	O K
2880 Summer	0.1	0.1	131.0638	0.5637	2.1	O K
4320 Summer	0.1	0.1	130.9302	0.4302	1.6	O K
5760 Summer	0.1	0.1	130.8302	0.3302	1.2	O K
7200 Summer	0.1	0.1	130.7527	0.2527	0.9	O K
8640 Summer	0.1	0.1	130.6927	0.1927	0.7	O K
10080 Summer	0.1	0.1	130.6443	0.1443	0.5	O K
15 Winter	0.1	0.1	130.9702	0.4702	1.8	O K
30 Winter	0.1	0.1	131.1283	0.6283	2.3	O K
60 Winter	0.1	0.1	131.2883	0.7883	2.9	O K
120 Winter	0.1	0.1	131.4253	0.9253	3.4	O K
180 Winter	0.1	0.1	131.4733	0.9733	3.6	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	68.99	18
30 Summer	47.08	33
60 Summer	30.81	62
120 Summer	19.53	120
180 Summer	14.75	170
240 Summer	12.05	198
360 Summer	9.05	262
480 Summer	7.38	330
600 Summer	6.29	402
720 Summer	5.52	470
960 Summer	4.49	608
1440 Summer	3.35	880
2160 Summer	2.49	1276
2880 Summer	2.02	1648
4320 Summer	1.50	2416
5760 Summer	1.21	3120
7200 Summer	1.03	3888
8640 Summer	0.90	4584
10080 Summer	0.81	5248
15 Winter	68.99	18
30 Winter	47.08	32
60 Winter	30.81	62
120 Winter	19.53	118
180 Winter	14.75	172

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Date aug 2025	Designed By DS	
File calc-tjba-harrison-hillbank st-SW att...	Checked By	
Micro Drainage		Source Control W.10.4

Summary of Results for 30 year Return Period (+40%)

Storm Duration (mins)	Maximum Filtration (1/s)	Maximum Outflow (1/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
240 Winter	0.2	0.2	131.4893	0.9893	3.7	O K
360 Winter	0.2	0.2	131.5013	1.0013	3.7	O K
480 Winter	0.2	0.2	131.4933	0.9933	3.7	O K
600 Winter	0.1	0.1	131.4733	0.9733	3.6	O K
720 Winter	0.1	0.1	131.4483	0.9483	3.5	O K
960 Winter	0.1	0.1	131.3918	0.8918	3.3	O K
1440 Winter	0.1	0.1	131.2828	0.7828	2.9	O K
2160 Winter	0.1	0.1	131.1403	0.6403	2.4	O K
2880 Winter	0.1	0.1	131.0237	0.5237	1.9	O K
4320 Winter	0.1	0.1	130.8497	0.3497	1.3	O K
5760 Winter	0.1	0.1	130.7283	0.2282	0.8	O K
7200 Winter	0.1	0.1	130.6402	0.1403	0.5	O K
8640 Winter	0.1	0.1	130.5777	0.0778	0.3	O K
10080 Winter	0.1	0.1	130.5488	0.0487	0.2	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	12.05	222
360 Winter	9.05	278
480 Winter	7.38	356
600 Winter	6.29	432
720 Winter	5.52	506
960 Winter	4.49	654
1440 Winter	3.35	938
2160 Winter	2.49	1344
2880 Winter	2.02	1732
4320 Winter	1.50	2508
5760 Winter	1.21	3232
7200 Winter	1.03	3960
8640 Winter	0.90	4584
10080 Winter	0.81	5136

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104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
Date aug 2025	Designed By DS	
File calc-tjba-harrison-hillbank st-SW att...	Checked By	
Micro Drainage	Source Control W.10.4	

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	30	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+40
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.009

Time (mins)		Area
from:	to:	(ha)
0	4	0.009

T J Booth Associates

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104 Yorkshire St
Rochdale
Lancashire OL16 1JY

SW soakaway (individual)
harrison
hillbank st castleton

Date aug 2025

Designed By DS

File calc-tjba-harrison-hillbank st-SW att...

Checked By

Micro Drainage

Source Control W.10.4



Lined Soakaway Details

Infil Coef - Base (m/hr)	0.071000	Pit Multiplier	2.0
Infil Coef - Sides (m/hr)	0.071000	Number Required	1
Safety Factor	2.0	Invert Level (m)	130.500
Porosity	0.56	Cover Level (m)	132.000
Ring Diameter (m)	1.2		

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104 Yorkshire St Rochdale Lancashire OL16 1JY	SW soakaway (individual) harrison hillbank st castleton	
Date aug 2025	Designed By DS	
File calc-tjba-harrison-hillbank st-SW att...	Checked By	
Micro Drainage		Source Control W.10.4

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 288 minutes

Storm Duration (mins)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
15 Summer	0.1	0.1	131.0643	0.5642	2.1	O K
30 Summer	0.1	0.1	131.2628	0.7628	2.8	O K
60 Summer	0.1	0.1	131.4658	0.9658	3.6	O K
120 Summer	0.2	0.2	131.6338	1.1338	4.2	O K
180 Summer	0.2	0.2	131.6868	1.1868	4.4	O K
240 Summer	0.2	0.2	131.7063	1.2063	4.5	O K
360 Summer	0.2	0.2	131.7238	1.2238	4.6	O K
480 Summer	0.2	0.2	131.7213	1.2213	4.5	O K
600 Summer	0.2	0.2	131.7077	1.2078	4.5	O K
720 Summer	0.2	0.2	131.6878	1.1878	4.4	O K
960 Summer	0.2	0.2	131.6403	1.1403	4.2	O K
1440 Summer	0.2	0.2	131.5438	1.0438	3.9	O K
2160 Summer	0.1	0.1	131.4163	0.9163	3.4	O K
2880 Summer	0.1	0.1	131.3068	0.8068	3.0	O K
4320 Summer	0.1	0.1	131.1348	0.6348	2.4	O K
5760 Summer	0.1	0.1	131.0067	0.5067	1.9	O K
7200 Summer	0.1	0.1	130.9077	0.4077	1.5	O K
8640 Summer	0.1	0.1	130.8277	0.3277	1.2	O K
10080 Summer	0.1	0.1	130.7637	0.2637	1.0	O K
15 Winter	0.1	0.1	131.1338	0.6338	2.4	O K
30 Winter	0.1	0.1	131.3583	0.8583	3.2	O K
60 Winter	0.2	0.2	131.5893	1.0893	4.1	O K
120 Winter	0.2	0.2	131.7883	1.2882	4.8	O K
180 Winter	0.2	0.2	131.8572	1.3572	5.1	FLOOD RISK

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	89.23	18
30 Summer	61.54	33
60 Summer	40.51	62
120 Summer	25.63	122
180 Summer	19.23	180
240 Summer	15.63	206
360 Summer	11.65	270
480 Summer	9.44	336
600 Summer	8.01	406
720 Summer	7.00	476
960 Summer	5.65	616
1440 Summer	4.17	882
2160 Summer	3.07	1280
2880 Summer	2.46	1672
4320 Summer	1.81	2420
5760 Summer	1.45	3168
7200 Summer	1.23	3896
8640 Summer	1.07	4592
10080 Summer	0.95	5344
15 Winter	89.23	18
30 Winter	61.54	33
60 Winter	40.51	62
120 Winter	25.63	118
180 Winter	19.23	174

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104 Yorkshire St
Rochdale
Lancashire OL16 1JYSW soakaway (individual)
harrison
hillbank st castleton

Date aug 2025

Designed By DS

File calc-tjba-harrison-hillbank st-SW att...

Checked By

Micro Drainage

Source Control W.10.4

Summary of Results for 100 year Return Period (+45%)

Storm Duration (mins)	Maximum Filtration (1/s)	Maximum Outflow (1/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m ³)	Status
240 Winter	0.2	0.2	131.8807	1.3807	5.1	FLOOD RISK
360 Winter	0.2	0.2	131.8947	1.3947	5.2	FLOOD RISK
480 Winter	0.2	0.2	131.8872	1.3872	5.2	FLOOD RISK
600 Winter	0.2	0.2	131.8637	1.3637	5.1	FLOOD RISK
720 Winter	0.2	0.2	131.8322	1.3322	5.0	FLOOD RISK
960 Winter	0.2	0.2	131.7588	1.2588	4.7	O K
1440 Winter	0.2	0.2	131.6113	1.1113	4.1	O K
2160 Winter	0.1	0.1	131.4263	0.9263	3.4	O K
2880 Winter	0.1	0.1	131.2758	0.7758	2.9	O K
4320 Winter	0.1	0.1	131.0522	0.5522	2.1	O K
5760 Winter	0.1	0.1	130.8967	0.3967	1.5	O K
7200 Winter	0.1	0.1	130.7818	0.2817	1.0	O K
8640 Winter	0.1	0.1	130.6947	0.1947	0.7	O K
10080 Winter	0.1	0.1	130.6273	0.1273	0.5	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	15.63	226
360 Winter	11.65	282
480 Winter	9.44	360
600 Winter	8.01	436
720 Winter	7.00	512
960 Winter	5.65	662
1440 Winter	4.17	950
2160 Winter	3.07	1360
2880 Winter	2.46	1760
4320 Winter	1.81	2512
5760 Winter	1.45	3280
7200 Winter	1.23	4032
8640 Winter	1.07	4752
10080 Winter	0.95	5440

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104 Yorkshire St
Rochdale
Lancashire OL16 1JYSW soakaway (individual)
harrison
hillbank st castleton

Date aug 2025

Designed By DS

File calc-tjba-harrison-hillbank st-SW att...

Checked By

Micro Drainage

Source Control W.10.4

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	100	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+45
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 0.009

Time	(mins)	Area
from:	to:	(ha)
0	4	0.009

T J Booth Associates

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104 Yorkshire St
 Rochdale
 Lancashire OL16 1JY

SW soakaway (individual)
 harrison
 hillbank st castleton

Date aug 2025

Designed By DS

File calc-tjba-harrison-hillbank st-SW att...

Checked By

Micro Drainage

Source Control W.10.4

Lined Soakaway Details

Infil Coef - Base (m/hr)	0.071000	Pit Multiplier	2.0
Infil Coef - Sides (m/hr)	0.071000	Number Required	1
Safety Factor	2.0	Invert Level (m)	130.500
Porosity	0.56	Cover Level (m)	132.000
Ring Diameter (m)	1.2		

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5.7 UU Plan.

