

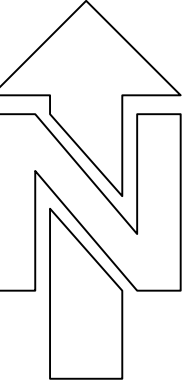
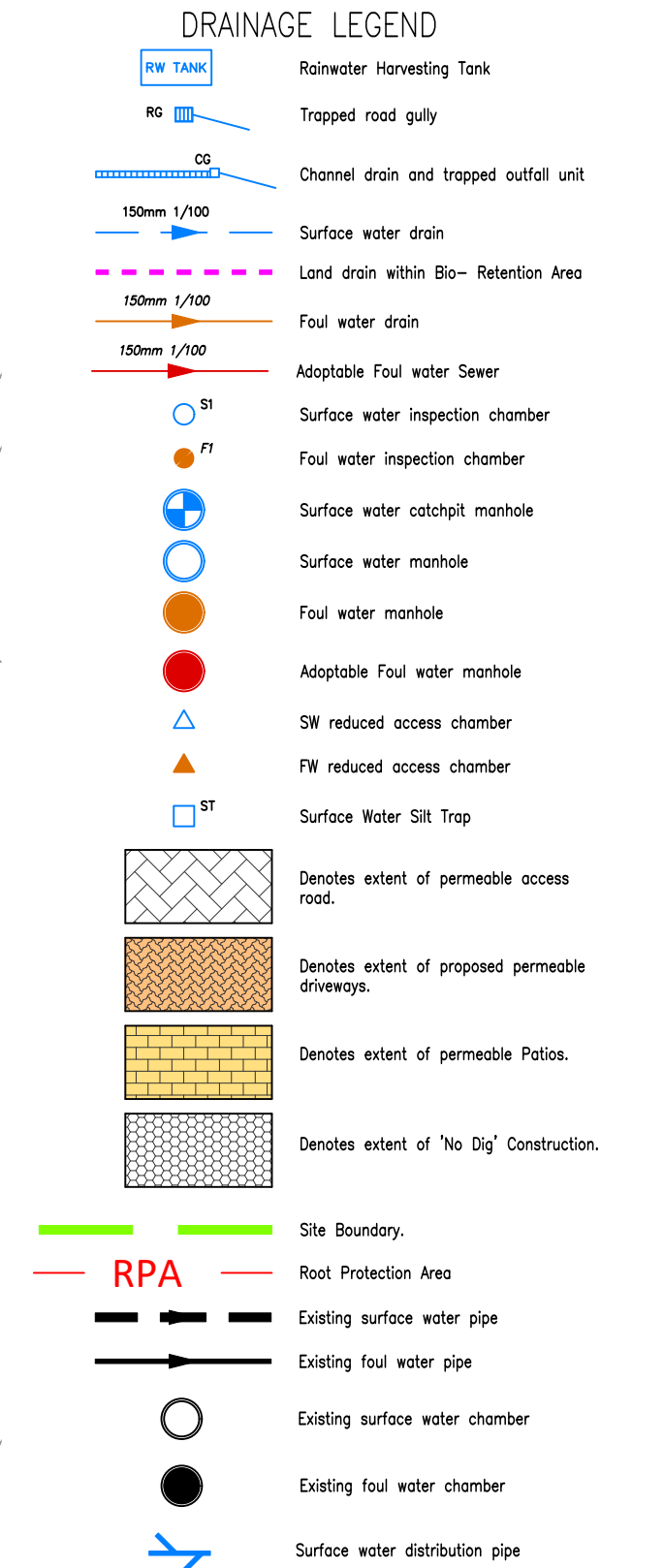
Appendix G

Surface Water Drainage Strategy & Surface Water Interception Plan

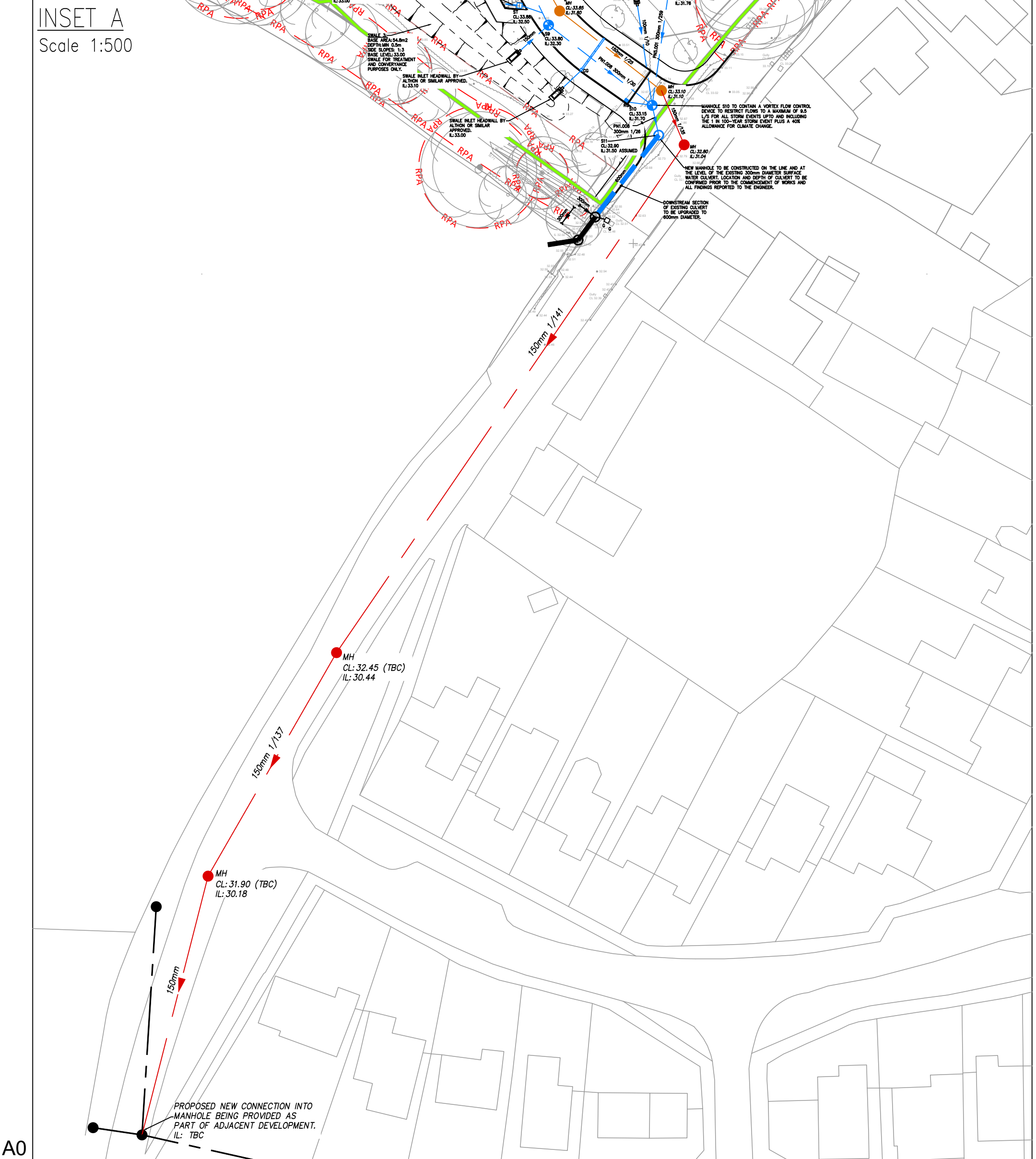
SURFACE WATER DESIGN NOTES

- A Site Investigation report by Avon Associates (Ref: 25-129-02) established that infiltration techniques are not feasible.
- Surface water discharge rates are to be a maximum of 9.5 l/s, which is the equivalent 1 in 2 year run-off rate.
- The Surface water drainage scheme comprises of a variety of SuDs that will manage surface water runoff, with the systems arranged in series to form an effective surface water management train that, collectively captures, conveys and stores surface water runoff from the development, whilst also delivering interception and pollution risk management. The systems in conjunction with retained open space would also promote other environmental objectives of the development by providing a habitat for local plants and wildlife. The main components include:
 - Roof water runoff from dwellings will be captured by traditional rainwater gutters and downpipes that would discharge to 1500 litre rainwater harvesting units located in rear gardens for the purposes of irrigation and clearing of external areas.
 - Permeable paving is to be used for the interception and treatment of surface water runoff from private drives and parking areas. Permeable paving will allow surface water to infiltrate through a block paved surface into a filter zone of sub-base beneath the bedding layer. As ground conditions will not permit infiltration a perforated collector pipe would be provided at the base of the system for conveyance of surface water downstream.
 - Overflow pipework from rainwater harvesting units and any roof water not discharged to rainwater harvesting units is to be discharged to the filter zone of sub-base beneath areas of nearby permeable paving for treatment.
 - A combination of swales and bioretention systems will be used alongside the road network and paved areas for interception, treatment and conveyance of roof runoff.
 - A traditional below ground surface water drainage system located in the developments estate roads with narrow below ground attenuation tanks and flow controls, which control and store all runoff to a peak rate of 9.5 l/s for all storm events up to and including the 1 in 100 year including a 45% allowance for climate change using a cascading approach.
- The development will be provided with a new foul water drainage system comprising of a traditional gravity network of below ground pipework that would discharge to the existing foul sewer located to the south of the site in Chapel Road.
- Water quality improvements to be provided in the form of permeable paving, bio retention areas and swales. Refer to Table 1 for details.

Use	Pollution Hazard Index			SuDs Component	Mitigation Index		
	TSS	Metals	TPH		TSS	Metals	TPH
Residential Roof	0.2	0.2	0.05	Permeable Paving	0.4	0.4	0.4
Individual property driveways	0.5	0.4	0.4	Permeable Paving	0.7	0.6	0.7
Access Road	0.5	0.4	0.4	Bioretention System	0.8	0.8	0.8
Access Road	0.5	0.4	0.4	Swale	0.5	0.6	0.6



DO NOT SCALE



FOR CONTINUATION
REFER TO INSET A

PI	MR	ISSUE	REVISION	AI	15.08.28
MAK				BY	DATE

DRAWING STATUS
PRELIMINARY

DRAWING TITLE
DRAINAGE LAYOUT

PROJECT
CHAPEL ROAD, BARNES GREEN

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Drawn	Chnl	Scale	Date
AU	GC	1:250 @ A0	MAY 2020

PRELIMINARY

Project Number	Drawing Number	Revision
P25-1183	01	P1



INTERCEPTION SUDS PLAN
SCALE 1:500

INTERCEPTION PLAN LEGEND

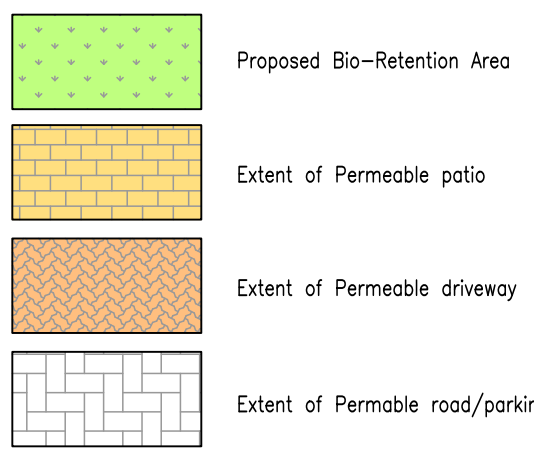


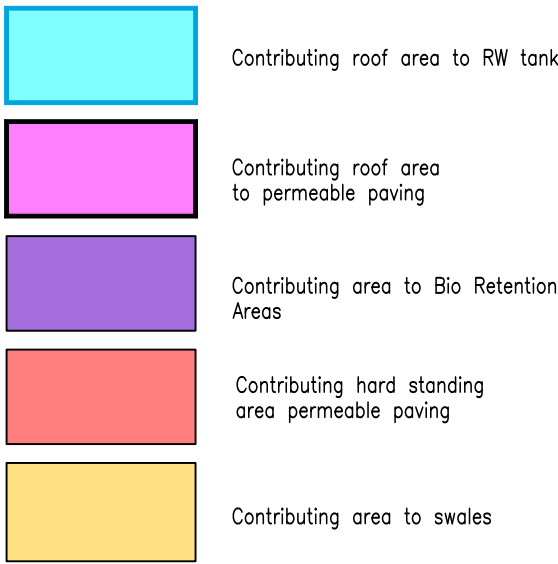
Table 1.1: Contributing areas

Component	Total Drained area (m ²)	Total Surface area (m ²)	Ratio of Surface to Drained area	Compliance
Rainwater Harvesting	2490.8	N/A	N/A	46,500 litre capacity provided through 1500 litre unit/plot, which exceeds requirement of 12,454 litres
Permeable Paving	3407.7	2508.0	1.4	Drained area is less than 5 times the surface area
Bioretention Systems	1018.7	204.2	4.99	Drained area is less than 5 times the surface area
Swales	791.6	351.2	2.3	Drained area is less than 5 times the regulated base surface area



COLLECTIVE AREAS PLAN
SCALE 1:500

COLLECTIVE AREA PLAN LEGEND



REV	DATE	BY	CHKD	DATE
P1	15.05.24	AK	AK	15.05.24

DRAWING STATUS
PRELIMINARY

DRAWING TITLE
INTERCEPTION PLAN

PROJECT
CHAPEL ROAD, BARNES GREEN

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Drawn	Chkd	Scales	Date
AK	AK	1:500 @ A0	MAY 2024
Purpose of Issue			
PRELIMINARY			
Project Number	Drawing Number	Revision	
P25-1183	05	P1	

Appendix H

Drainage Network Simulation Results

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	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)	50.0		

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓ S1	0.014	5.00	41.950	Manhole	Adoptable	1200	512487.802	127201.678	2.150
✓ S2	0.098	5.00	40.750	Manhole	Adoptable	1200	512475.071	127175.729	2.750
✓ S3	0.000		40.250	Manhole	Adoptable	1200	512475.375	127161.037	2.650
✓ S4	0.022	5.00	39.420	Manhole	Adoptable	1500	512493.264	127153.805	1.920
✓ S4a	0.004	5.00	39.220	Manhole	Adoptable	1800	512496.882	127151.119	2.420
✓ S5	0.066	5.00	38.450	Manhole	Adoptable	1800	512511.639	127140.164	1.750
✓ S6	0.074	5.00	36.950	Manhole	Adoptable	1500	512537.678	127118.798	3.250
✓ S7	0.144	5.00	35.600	Manhole	Adoptable	1800	512566.499	127104.111	2.000
✓ S8	0.018	5.00	34.700	Manhole	Adoptable	1200	512584.617	127085.303	1.500
✓ S9	0.036	5.00	33.800	Manhole	Adoptable	1200	512597.852	127060.345	1.500
✓ S10	0.090	5.00	33.150	Manhole	Adoptable	1500	512612.139	127049.276	1.451
✓ S11	0.000		32.520	Manhole	Adoptable	1200	512613.047	127045.159	1.021
✓ S12	0.036	5.00	39.950	Manhole	Adoptable	1200	512468.931	127151.339	1.950
✓ S13	0.112	5.00	39.480	Manhole	Adoptable	1800	512518.031	127151.489	2.680
✓ S14	0.017	5.00	39.650	Manhole	Adoptable	1200	512555.610	127187.154	1.450
✓ S15	0.018	5.00	39.120	Manhole	Adoptable	1200	512574.136	127182.650	1.620
✓ S16			38.580	Manhole	Adoptable	1200	512585.043	127173.795	2.630
✓ S17	0.037	5.00	37.350	Manhole	Adoptable	1500	512583.575	127146.870	3.550

Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓	S18	0.000	5.00	35.200	Manhole	Adoptable	1200	512582.097	127104.646	3.300
✓	S19	0.000		33.700	Manhole	Adoptable	1200	512614.408	127064.882	1.940

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	28.904	0.600	39.800	38.000	1.800	16.1	225	Circular	5.15	50.0
1.001	S2	S3	14.695	0.600	38.000	37.600	0.400	36.7	225	Circular	5.26	50.0
2.000	S12	S3	11.644	0.600	38.000	37.600	0.400	29.1	150	Circular	5.10	50.0
1.002	S3	S4	19.296	0.600	37.600	37.500	0.100	193.0	300	Circular	5.55	50.0
1.003	S4	S4a	4.506	0.600	37.500	37.100	0.400	11.3	300	Circular	5.56	50.0
1.003a	S4a	S5	18.379	0.600	36.800	36.700	0.100	183.8	600	Circular	5.73	50.0
3.000	S13	S5	13.004	0.600	36.800	36.700	0.100	130.0	600	Circular	5.10	50.0
1.004	S5	S6	33.683	0.600	36.700	35.500	1.200	28.1	300	Circular	5.92	50.0
1.005	S6	S7	32.347	0.600	33.700	33.600	0.100	323.5	600	Circular	6.32	50.0
4.000	S14	S15	19.066	0.600	38.200	37.500	0.700	27.2	150	Circular	5.16	50.0
4.001	S15	S16	14.049	0.600	37.500	35.950	1.550	9.1	150	Circular	5.23	50.0
4.002	S16	S17	26.965	0.600	35.950	35.300	0.650	41.5	225	Circular	5.45	50.0
4.003	S17	S7	46.043	0.600	33.800	33.600	0.200	230.2	450	Circular	6.03	50.0
1.006	S7	S8	26.115	0.600	33.600	33.200	0.400	65.3	300	Circular	6.54	50.0

Name	US Node	DS Node	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	S1	S2	3.281	130.5	2.5	1.925	2.525	0.014	0.0	22	1.296
1.001	S2	S3	2.165	86.1	20.2	2.525	2.425	0.112	0.0	74	1.781
2.000	S12	S3	1.873	33.1	6.5	1.800	2.500	0.036	0.0	45	1.456
1.002	S3	S4	1.128	79.7	26.7	2.350	1.620	0.148	0.0	119	1.019
1.003	S4	S4a	4.709	332.9	30.7	1.620	1.820	0.170	0.0	61	2.984
1.003a	S4a	S5	1.793	506.9	31.4	1.820	1.150	0.174	0.0	100	1.016
3.000	S13	S5	2.134	603.3	20.2	2.080	1.150	0.112	0.0	74	1.012
1.004	S5	S6	2.978	210.5	63.6	1.450	1.150	0.352	0.0	113	2.620
1.005	S6	S7	1.348	381.2	77.0	2.650	1.400	0.426	0.0	181	1.065
4.000	S14	S15	1.937	34.2	3.1	1.300	1.470	0.017	0.0	30	1.201
4.001	S15	S16	3.366	59.5	6.3	1.470	2.480	0.035	0.0	33	2.208
4.002	S16	S17	2.037	81.0	6.3	2.405	1.825	0.035	0.0	43	1.227
4.003	S17	S7	1.335	212.4	13.0	3.100	1.550	0.072	0.0	75	0.753
1.006	S7	S8	1.948	137.7	116.0	1.700	1.200	0.642	0.0	212	2.174

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.007	S8	S9	28.250	0.600	33.200	32.300	0.900	31.4	300	Circular	6.71	50.0
1.008	S9	S10	18.073	0.600	32.300	31.700	0.600	30.1	300	Circular	6.82	50.0
5.000	S18	S19	51.236	0.600	31.900	31.760	0.140	366.0	300	Circular	6.05	50.0
5.001	S19	S10	15.770	0.600	31.760	31.699	0.061	258.5	300	Circular	6.32	50.0
1.009	S10	S11	4.216	0.600	31.699	31.499	0.200	21.1	300	Circular	6.84	50.0

Name	US Node	DS Node	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)
1.007	S8	S9	2.816	199.0	119.3	1.200	1.200	0.660	0.0	167	2.936
1.008	S9	S10	2.875	203.2	125.8	1.200	1.150	0.696	0.0	171	3.019
5.000	S18	S19	0.816	57.7	0.0	3.000	1.640	0.000	0.0	0	0.000
5.001	S19	S10	0.973	68.8	0.0	1.640	1.151	0.000	0.0	0	0.000
1.009	S10	S11	3.439	243.1	142.0	1.151	0.721	0.786	0.0	165	3.567

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	28.904	16.1	225	Circular	41.950	39.800	1.925	40.750	38.000	2.525
1.001	14.695	36.7	225	Circular	40.750	38.000	2.525	40.250	37.600	2.425
2.000	11.644	29.1	150	Circular	39.950	38.000	1.800	40.250	37.600	2.500
1.002	19.296	193.0	300	Circular	40.250	37.600	2.350	39.420	37.500	1.620
1.003	4.506	11.3	300	Circular	39.420	37.500	1.620	39.220	37.100	1.820
1.003a	18.379	183.8	600	Circular	39.220	36.800	1.820	38.450	36.700	1.150
3.000	13.004	130.0	600	Circular	39.480	36.800	2.080	38.450	36.700	1.150
1.004	33.683	28.1	300	Circular	38.450	36.700	1.450	36.950	35.500	1.150
1.005	32.347	323.5	600	Circular	36.950	33.700	2.650	35.600	33.600	1.400

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
2.000	S12	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1500	Manhole	Adoptable
1.003	S4	1500	Manhole	Adoptable	S4a	1800	Manhole	Adoptable
1.003a	S4a	1800	Manhole	Adoptable	S5	1800	Manhole	Adoptable
3.000	S13	1800	Manhole	Adoptable	S5	1800	Manhole	Adoptable
1.004	S5	1800	Manhole	Adoptable	S6	1500	Manhole	Adoptable
1.005	S6	1500	Manhole	Adoptable	S7	1800	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)
4.000	19.066	27.2	150	Circular	39.650	38.200	1.300	39.120	37.500	1.470
4.001	14.049	9.1	150	Circular	39.120	37.500	1.470	38.580	35.950	2.480
4.002	26.965	41.5	225	Circular	38.580	35.950	2.405	37.350	35.300	1.825
4.003	46.043	230.2	450	Circular	37.350	33.800	3.100	35.600	33.600	1.550
1.006	26.115	65.3	300	Circular	35.600	33.600	1.700	34.700	33.200	1.200
1.007	28.250	31.4	300	Circular	34.700	33.200	1.200	33.800	32.300	1.200
1.008	18.073	30.1	300	Circular	33.800	32.300	1.200	33.150	31.700	1.150
5.000	51.236	366.0	300	Circular	35.200	31.900	3.000	33.700	31.760	1.640
5.001	15.770	258.5	300	Circular	33.700	31.760	1.640	33.150	31.699	1.151
1.009	4.216	21.1	300	Circular	33.150	31.699	1.151	32.520	31.499	0.721

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.000	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable
4.001	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
4.002	S16	1200	Manhole	Adoptable	S17	1500	Manhole	Adoptable
4.003	S17	1500	Manhole	Adoptable	S7	1800	Manhole	Adoptable
1.006	S7	1800	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.007	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
1.008	S9	1200	Manhole	Adoptable	S10	1500	Manhole	Adoptable
5.000	S18	1200	Manhole	Adoptable	S19	1200	Manhole	Adoptable
5.001	S19	1200	Manhole	Adoptable	S10	1500	Manhole	Adoptable
1.009	S10	1500	Manhole	Adoptable	S11	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
S1	512487.802	127201.678	41.950	2.150	1200	Manhole	Adoptable		0	1.000	39.800	225	Circular
S2	512475.071	127175.729	40.750	2.750	1200	Manhole	Adoptable		1	1.000	38.000	225	Circular
S3	512475.375	127161.037	40.250	2.650	1200	Manhole	Adoptable		1	2.000	37.600	150	Circular
									2	1.001	37.600	225	Circular
									0	1.002	37.600	300	Circular
S4	512493.264	127153.805	39.420	1.920	1500	Manhole	Adoptable		1	1.002	37.500	300	Circular
									0	1.003	37.500	300	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
S4a	512496.882	127151.119	39.220	2.420	1800	Manhole	Adoptable		1	1.003	37.100	300	Circular
									0	1.003a	36.800	600	Circular
S5	512511.639	127140.164	38.450	1.750	1800	Manhole	Adoptable		1	3.000	36.700	600	Circular
									2	1.003a	36.700	600	Circular
									0	1.004	36.700	300	Circular
S6	512537.678	127118.798	36.950	3.250	1500	Manhole	Adoptable		1	1.004	35.500	300	Circular
									0	1.005	33.700	600	Circular
S7	512566.499	127104.111	35.600	2.000	1800	Manhole	Adoptable		1	4.003	33.600	450	Circular
									2	1.005	33.600	600	Circular
									0	1.006	33.600	300	Circular
S8	512584.617	127085.303	34.700	1.500	1200	Manhole	Adoptable		1	1.006	33.200	300	Circular
									0	1.007	33.200	300	Circular
S9	512597.852	127060.345	33.800	1.500	1200	Manhole	Adoptable		1	1.007	32.300	300	Circular
									0	1.008	32.300	300	Circular
S10	512612.139	127049.276	33.150	1.451	1500	Manhole	Adoptable		1	5.001	31.699	300	Circular
									2	1.008	31.700	300	Circular
									0	1.009	31.699	300	Circular
S11	512613.047	127045.159	32.520	1.021	1200	Manhole	Adoptable		1	1.009	31.499	300	Circular
S12	512468.931	127151.339	39.950	1.950	1200	Manhole	Adoptable		0	2.000	38.000	150	Circular
S13	512518.031	127151.489	39.480	2.680	1800	Manhole	Adoptable		0	3.000	36.800	600	Circular
S14	512555.610	127187.154	39.650	1.450	1200	Manhole	Adoptable		0	4.000	38.200	150	Circular
S15	512574.136	127182.650	39.120	1.620	1200	Manhole	Adoptable		1	4.000	37.500	150	Circular
									0	4.001	37.500	150	Circular
S16	512585.043	127173.795	38.580	2.630	1200	Manhole	Adoptable		1	4.001	35.950	150	Circular
									0	4.002	35.950	225	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections		Link	IL (m)	Dia (mm)	Link Type
S17	512583.575	127146.870	37.350	3.550	1500	Manhole	Adoptable		1	4.002	35.300	225	Circular
									0	4.003	33.800	450	Circular
S18	512582.097	127104.646	35.200	3.300	1200	Manhole	Adoptable		0	5.000	31.900	300	Circular
									0	5.000	31.760	300	Circular
S19	512614.408	127064.882	33.700	1.940	1200	Manhole	Adoptable		1	5.000	31.760	300	Circular
									0	5.001	31.760	300	Circular

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
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	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	ReFH2	Storm Duration (mins)	360
Region	England, Wales, NI	Betterment (%)	0
Include Baseflow	x	Runoff Volume (m³)	
Positively Drained Area (ha)	0.780		

Node S10 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	31.699	Product Number	CTL-SHE-0137-9500-1350-9500
Design Depth (m)	1.350	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	9.5	Min Node Diameter (mm)	1500

Node S5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	36.700	Product Number	CTL-SHE-0117-7500-1700-7500
Design Depth (m)	1.700	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.5	Min Node Diameter (mm)	1500

Node S7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	33.600	Product Number	CTL-SHE-0139-1050-1650-1050
Design Depth (m)	1.650	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.5	Min Node Diameter (mm)	1500

Node S4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	37.500	Product Number	CTL-SHE-0076-3400-1875-3400
Design Depth (m)	1.875	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.4	Min Node Diameter (mm)	1200

Node S19 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	32.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	248.0	248.0	0.800	248.0	292.7	0.801	0.0	292.7

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	37.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	224

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	116.0	116.0	0.800	116.0	146.5	0.801	0.0	146.5

Node S7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	34.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	277.0	277.0	0.800	277.0	324.2	0.801	0.0	324.2

Node S4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	85.0	85.0	0.800	85.0	111.1	0.801	0.0	111.1

Node S3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	38.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	156

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	72.0	72.0	0.800	72.0	96.1	0.801	0.0	96.1

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	39.822	0.022	2.7	0.0280	0.0000	OK
180 minute summer	S2	128	38.154	0.154	8.2	0.2838	0.0000	OK
180 minute summer	S3	128	38.154	0.554	9.9	0.6264	0.0000	SURCHARGED
180 minute summer	S4	128	38.154	0.654	11.3	13.7600	0.0000	SURCHARGED
120 minute summer	S4a	80	37.406	0.606	4.0	1.5625	0.0000	SURCHARGED
120 minute summer	S5	80	37.406	0.706	14.2	2.3287	0.0000	SURCHARGED
180 minute summer	S6	156	34.563	0.863	12.8	1.9192	0.0000	SURCHARGED
180 minute summer	S7	160	34.563	0.963	24.9	20.5785	0.0000	SURCHARGED
15 minute summer	S8	11	33.253	0.053	13.6	0.0723	0.0000	OK
480 minute winter	S9	408	32.445	0.145	11.8	0.2343	0.0000	OK
480 minute winter	S10	408	32.445	0.746	14.1	2.2442	0.0000	SURCHARGED
15 minute winter	S11	107	31.539	0.040	9.5	0.0000	0.0000	OK
180 minute summer	S12	132	38.154	0.154	2.6	0.2309	0.0000	SURCHARGED
120 minute summer	S13	80	37.405	0.605	10.6	2.0467	0.0000	SURCHARGED
15 minute summer	S14	10	38.231	0.031	3.2	0.0422	0.0000	OK
15 minute summer	S15	10	37.534	0.034	6.6	0.0455	0.0000	OK
15 minute summer	S16	11	35.994	0.044	6.5	0.0494	0.0000	OK
180 minute summer	S17	156	34.566	0.766	5.7	1.5135	0.0000	SURCHARGED
360 minute winter	S18	368	32.446	0.546	1.7	0.6176	0.0000	SURCHARGED
480 minute winter	S19	408	32.445	0.685	5.1	35.1093	0.0000	SURCHARGED
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	S1	1.000	S2	2.6	0.417	0.020	0.2179	
180 minute summer	S2	1.001	S3	7.6	0.619	0.088	0.5048	
180 minute summer	S3	1.002	S4	9.7	0.333	0.122	1.3588	
180 minute summer	S4	1.003	S4a	2.6	1.386	0.008	0.1378	
120 minute summer	S4a	1.003a	S5	3.8	0.166	0.007	5.1767	
120 minute summer	S5	1.004	S6	7.5	1.409	0.036	0.1788	
180 minute summer	S6	1.005	S7	14.1	0.159	0.037	9.1114	
180 minute summer	S7	1.006	S8	10.5	1.268	0.076	0.2231	
15 minute summer	S8	1.007	S9	13.5	1.502	0.068	0.2701	
480 minute winter	S9	1.008	S10	11.8	0.310	0.058	0.9421	
480 minute winter	S10	1.009	S11	9.5	1.573	0.039	0.0254	231.1
180 minute summer	S12	2.000	S3	2.4	0.311	0.073	0.2050	
120 minute summer	S13	3.000	S5	8.0	0.277	0.013	3.6626	
15 minute summer	S14	4.000	S15	3.2	1.144	0.093	0.0530	
15 minute summer	S15	4.001	S16	6.5	1.837	0.110	0.0504	
15 minute summer	S16	4.002	S17	6.5	1.219	0.080	0.1440	
180 minute summer	S17	4.003	S7	4.0	0.080	0.019	7.2952	
360 minute winter	S18	5.000	S19	3.1	0.087	0.054	3.6080	
480 minute winter	S19	5.001	S10	8.9	0.126	0.129	1.1105	

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	39.835	0.035	6.9	0.0441	0.0000	OK
120 minute winter	S2	118	38.562	0.562	16.9	1.0372	0.0000	SURCHARGED
120 minute winter	S3	120	38.562	0.962	21.1	5.3969	0.0000	SURCHARGED
120 minute winter	S4	120	38.563	1.063	24.1	47.5864	0.0000	SURCHARGED
120 minute winter	S4a	116	37.810	1.010	10.0	2.6040	0.0000	SURCHARGED
120 minute winter	S5	116	37.810	1.110	30.6	37.8787	0.0000	SURCHARGED
240 minute winter	S6	236	34.835	1.135	13.8	2.5232	0.0000	SURCHARGED
240 minute winter	S7	236	34.835	1.235	32.6	93.2097	0.0000	SURCHARGED
15 minute summer	S8	9	33.262	0.062	19.0	0.0845	0.0000	OK
960 minute winter	S9	975	32.725	0.425	11.9	0.6848	0.0000	SURCHARGED
960 minute winter	S10	975	32.724	1.025	14.3	3.0835	0.0000	SURCHARGED
60 minute winter	S11	21	31.539	0.040	9.5	0.0000	0.0000	OK
120 minute winter	S12	120	38.562	0.562	5.5	0.8437	0.0000	SURCHARGED
120 minute winter	S13	116	37.810	1.010	17.0	3.4148	0.0000	SURCHARGED
15 minute summer	S14	10	38.251	0.051	8.4	0.0697	0.0000	OK
15 minute summer	S15	10	37.555	0.055	17.2	0.0746	0.0000	OK
15 minute summer	S16	10	36.022	0.072	17.1	0.0811	0.0000	OK
240 minute winter	S17	236	34.835	1.035	6.4	2.0452	0.0000	SURCHARGED
960 minute winter	S18	975	32.725	0.825	1.0	0.9327	0.0000	SURCHARGED
960 minute winter	S19	975	32.724	0.964	5.3	101.1619	0.0000	SURCHARGED

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	S1	1.000	S2	6.8	0.411	0.052	0.6313	
120 minute winter	S2	1.001	S3	16.0	0.687	0.186	0.5844	
120 minute winter	S3	1.002	S4	20.8	0.375	0.261	1.3588	
120 minute winter	S4	1.003	S4a	2.7	1.386	0.008	0.3173	
120 minute winter	S4a	1.003a	S5	-7.1	0.158	-0.014	5.1769	
120 minute winter	S5	1.004	S6	7.5	1.409	0.036	0.1788	
240 minute winter	S6	1.005	S7	14.7	0.176	0.039	9.1114	
240 minute winter	S7	1.006	S8	10.5	1.234	0.076	0.2224	
15 minute summer	S8	1.007	S9	18.6	1.415	0.094	0.5514	
960 minute winter	S9	1.008	S10	11.8	0.303	0.058	1.2727	
960 minute winter	S10	1.009	S11	9.4	1.572	0.039	0.0253	520.1
120 minute winter	S12	2.000	S3	5.1	0.518	0.154	0.2050	
120 minute winter	S13	3.000	S5	18.0	0.282	0.030	3.6629	
15 minute summer	S14	4.000	S15	8.3	1.494	0.243	0.1064	
15 minute summer	S15	4.001	S16	17.1	2.420	0.288	0.0996	
15 minute summer	S16	4.002	S17	16.9	1.592	0.209	0.2866	
240 minute winter	S17	4.003	S7	5.9	0.092	0.028	7.2952	
960 minute winter	S18	5.000	S19	-1.0	-0.017	-0.018	3.6080	
960 minute winter	S19	5.001	S10	9.1	0.129	0.132	1.1105	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 96.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	39.841	0.041	9.7	0.0520	0.0000	OK
30 minute summer	S2	19	38.818	0.818	70.6	1.5076	0.0000	SURCHARGED
240 minute winter	S3	236	38.769	1.169	17.7	19.7303	0.0000	SURCHARGED
240 minute winter	S4	236	38.769	1.269	20.2	64.6351	0.0000	SURCHARGED
120 minute winter	S4a	118	38.054	1.254	8.4	3.2325	0.0000	SURCHARGED
120 minute winter	S5	118	38.054	1.354	39.5	65.5680	0.0000	SURCHARGED
240 minute winter	S6	236	35.042	1.342	15.9	2.9841	0.0000	SURCHARGED
240 minute winter	S7	236	35.042	1.442	42.5	148.5970	0.0000	SURCHARGED
15 minute summer	S8	10	33.267	0.067	21.8	0.0912	0.0000	OK
1440 minute winter	S9	1470	32.900	0.600	11.8	0.9669	0.0000	SURCHARGED
1440 minute winter	S10	1470	32.898	1.199	13.8	3.6076	0.0000	FLOOD RISK
480 minute summer	S11	144	31.539	0.040	9.5	0.0000	0.0000	OK
240 minute winter	S12	236	38.769	0.769	4.5	1.1531	0.0000	SURCHARGED
120 minute winter	S13	118	38.054	1.254	23.7	4.2396	0.0000	SURCHARGED
15 minute summer	S14	10	38.262	0.062	11.8	0.0842	0.0000	OK
15 minute summer	S15	10	37.566	0.066	24.2	0.0899	0.0000	OK
15 minute summer	S16	10	36.036	0.086	24.1	0.0978	0.0000	OK
240 minute winter	S17	236	35.042	1.242	9.1	2.4548	0.0000	SURCHARGED
1440 minute winter	S18	1470	32.899	0.999	0.6	1.1293	0.0000	SURCHARGED
1440 minute winter	S19	1470	32.898	1.138	4.7	142.3745	0.0000	SURCHARGED
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	S1	1.000	S2	9.6	0.418	0.074	0.6467	
30 minute summer	S2	1.001	S3	65.9	1.656	0.765	0.5844	
240 minute winter	S3	1.002	S4	17.4	0.334	0.218	1.3588	
240 minute winter	S4	1.003	S4a	2.7	1.386	0.008	0.3173	
120 minute winter	S4a	1.003a	S5	-5.5	0.109	-0.011	5.1769	
120 minute winter	S5	1.004	S6	7.5	1.409	0.036	0.1788	
240 minute winter	S6	1.005	S7	15.7	0.194	0.041	9.1114	
240 minute winter	S7	1.006	S8	10.5	1.239	0.076	0.2216	
15 minute summer	S8	1.007	S9	21.8	1.424	0.109	1.0758	
1440 minute winter	S9	1.008	S10	11.6	0.301	0.057	1.2727	
1440 minute winter	S10	1.009	S11	9.3	1.566	0.038	0.0251	733.1
240 minute winter	S12	2.000	S3	4.3	0.315	0.130	0.2050	
120 minute winter	S13	3.000	S5	22.5	0.327	0.037	3.6629	
15 minute summer	S14	4.000	S15	11.7	1.631	0.342	0.1368	
15 minute summer	S15	4.001	S16	24.1	2.669	0.405	0.1267	
15 minute summer	S16	4.002	S17	23.7	1.742	0.293	0.3682	
240 minute winter	S17	4.003	S7	8.8	0.094	0.041	7.2952	
1440 minute winter	S18	5.000	S19	-0.6	-0.013	-0.011	3.6080	
1440 minute winter	S19	5.001	S10	8.1	0.115	0.118	1.1105	

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.31%

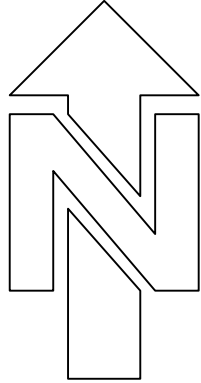
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	39.839	0.039	8.8	0.0497	0.0000	OK
30 minute summer	S2	19	38.713	0.713	64.3	1.3139	0.0000	SURCHARGED
180 minute winter	S3	180	38.689	1.089	19.3	14.1833	0.0000	SURCHARGED
180 minute winter	S4	180	38.689	1.189	22.1	58.0363	0.0000	SURCHARGED
120 minute winter	S4a	118	37.968	1.168	8.0	3.0106	0.0000	SURCHARGED
120 minute winter	S5	118	37.968	1.268	35.3	55.7934	0.0000	SURCHARGED
240 minute winter	S6	236	34.959	1.259	15.1	2.7997	0.0000	SURCHARGED
240 minute winter	S7	236	34.959	1.359	38.7	126.4405	0.0000	SURCHARGED
15 minute summer	S8	10	33.265	0.065	20.7	0.0888	0.0000	OK
1440 minute winter	S9	1350	32.840	0.540	11.8	0.8698	0.0000	SURCHARGED
1440 minute winter	S10	1380	32.839	1.140	13.8	3.4290	0.0000	SURCHARGED
120 minute summer	S11	32	31.539	0.040	9.5	0.0000	0.0000	OK
180 minute winter	S12	180	38.689	0.689	5.0	1.0333	0.0000	SURCHARGED
120 minute winter	S13	118	37.968	1.168	21.3	3.9484	0.0000	SURCHARGED
15 minute summer	S14	10	38.258	0.058	10.6	0.0793	0.0000	OK
15 minute summer	S15	10	37.563	0.063	21.8	0.0849	0.0000	OK
15 minute summer	S16	10	36.032	0.082	21.7	0.0924	0.0000	OK
240 minute winter	S17	236	34.959	1.159	8.1	2.2909	0.0000	SURCHARGED
1440 minute winter	S18	1380	32.839	0.939	0.8	1.0618	0.0000	SURCHARGED
1440 minute winter	S19	1380	32.839	1.079	4.7	128.3583	0.0000	SURCHARGED
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	S1	1.000	S2	8.7	0.409	0.067	0.6419	
30 minute summer	S2	1.001	S3	59.9	1.506	0.696	0.5844	
180 minute winter	S3	1.002	S4	19.0	0.348	0.239	1.3588	
180 minute winter	S4	1.003	S4a	2.6	1.385	0.008	0.3173	
120 minute winter	S4a	1.003a	S5	-5.1	0.113	-0.010	5.1769	
120 minute winter	S5	1.004	S6	7.5	1.409	0.036	0.1788	
240 minute winter	S6	1.005	S7	15.6	0.184	0.041	9.1114	
240 minute winter	S7	1.006	S8	10.5	1.238	0.076	0.2223	
15 minute summer	S8	1.007	S9	20.6	1.416	0.104	0.8732	
1440 minute winter	S9	1.008	S10	11.6	0.299	0.057	1.2727	
1440 minute winter	S10	1.009	S11	9.4	1.570	0.039	0.0253	718.6
180 minute winter	S12	2.000	S3	4.6	0.347	0.140	0.2050	
120 minute winter	S13	3.000	S5	20.8	0.306	0.034	3.6629	
15 minute summer	S14	4.000	S15	10.5	1.587	0.308	0.1266	
15 minute summer	S15	4.001	S16	21.7	2.591	0.365	0.1179	
15 minute summer	S16	4.002	S17	21.5	1.697	0.265	0.3419	
240 minute winter	S17	4.003	S7	7.7	0.087	0.036	7.2952	
1440 minute winter	S18	5.000	S19	3.0	0.086	0.053	3.6080	
1440 minute winter	S19	5.001	S10	8.8	0.125	0.128	1.1105	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	39.847	0.047	12.7	0.0594	0.0000	OK
15 minute summer	S2	11	39.199	1.199	101.5	2.2111	0.0000	SURCHARGED
240 minute winter	S3	236	39.189	1.589	23.4	48.9775	0.0000	SURCHARGED
240 minute winter	S4	236	39.189	1.689	23.4	68.0523	0.0000	FLOOD RISK
120 minute winter	S4a	118	38.451	1.651	9.6	4.2568	0.0000	SURCHARGED
120 minute winter	S5	118	38.450	1.750	51.5	94.0435	0.0497	FLOOD
360 minute winter	S6	352	35.274	1.574	14.9	3.4981	0.0000	SURCHARGED
360 minute winter	S7	352	35.274	1.674	39.9	210.3608	0.0000	SURCHARGED
15 minute summer	S8	10	33.272	0.072	25.3	0.0982	0.0000	OK
1440 minute winter	S9	1410	33.092	0.792	11.9	1.2765	0.0000	SURCHARGED
1440 minute winter	S10	1410	33.091	1.392	14.3	4.1857	0.0000	FLOOD RISK
1440 minute winter	S11	480	31.539	0.040	9.5	0.0000	0.0000	OK
240 minute winter	S12	236	39.189	1.189	5.9	1.7841	0.0000	SURCHARGED
120 minute winter	S13	118	38.450	1.650	30.9	5.5775	0.0000	SURCHARGED
15 minute summer	S14	10	38.272	0.072	15.4	0.0982	0.0000	OK
15 minute summer	S15	10	37.578	0.078	31.6	0.1061	0.0000	OK
15 minute summer	S16	10	36.051	0.101	31.4	0.1140	0.0000	OK
360 minute winter	S17	352	35.274	1.474	8.5	2.9117	0.0000	SURCHARGED
1440 minute winter	S18	1410	33.091	1.191	0.9	1.3467	0.0000	SURCHARGED
1440 minute winter	S19	1410	33.091	1.331	6.5	187.8720	0.0000	SURCHARGED
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	S1	1.000	S2	12.6	0.457	0.097	0.6617	
15 minute summer	S2	1.001	S3	96.1	2.416	1.116	0.5844	
240 minute winter	S3	1.002	S4	20.3	0.365	0.254	1.3588	
240 minute winter	S4	1.003	S4a	3.0	1.385	0.009	0.3173	
120 minute winter	S4a	1.003a	S5	-6.7	0.102	-0.013	5.1769	
120 minute winter	S5	1.004	S6	7.5	1.412	0.036	0.1795	
360 minute winter	S6	1.005	S7	14.6	0.172	0.038	9.1114	
360 minute winter	S7	1.006	S8	10.5	1.264	0.076	0.2214	
15 minute summer	S8	1.007	S9	25.2	1.413	0.127	1.1766	
1440 minute winter	S9	1.008	S10	11.7	0.300	0.058	1.2727	
1440 minute winter	S10	1.009	S11	9.5	1.574	0.039	0.0254	801.4
240 minute winter	S12	2.000	S3	5.7	0.346	0.171	0.2050	
120 minute winter	S13	3.000	S5	29.5	0.336	0.049	3.6629	
15 minute summer	S14	4.000	S15	15.3	1.731	0.447	0.1684	
15 minute summer	S15	4.001	S16	31.4	2.863	0.528	0.1539	
15 minute summer	S16	4.002	S17	31.1	1.865	0.384	0.4502	
360 minute winter	S17	4.003	S7	8.3	0.094	0.039	7.2952	
1440 minute winter	S18	5.000	S19	-0.9	-0.013	-0.015	3.6080	
1440 minute winter	S19	5.001	S10	-6.5	-0.092	-0.094	1.1105	

Appendix I

Finished Level Scheme



DO NOT SCALE

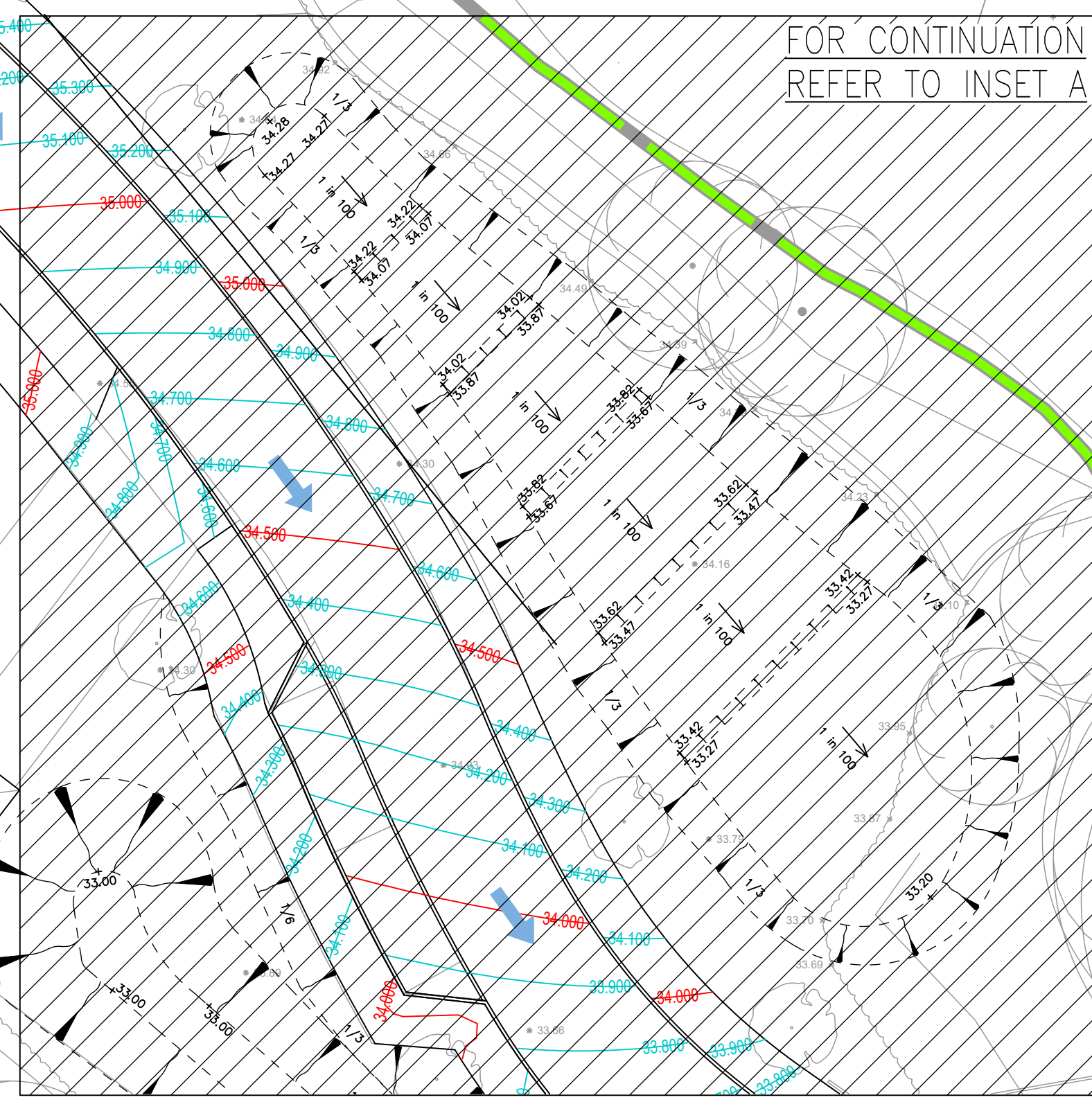
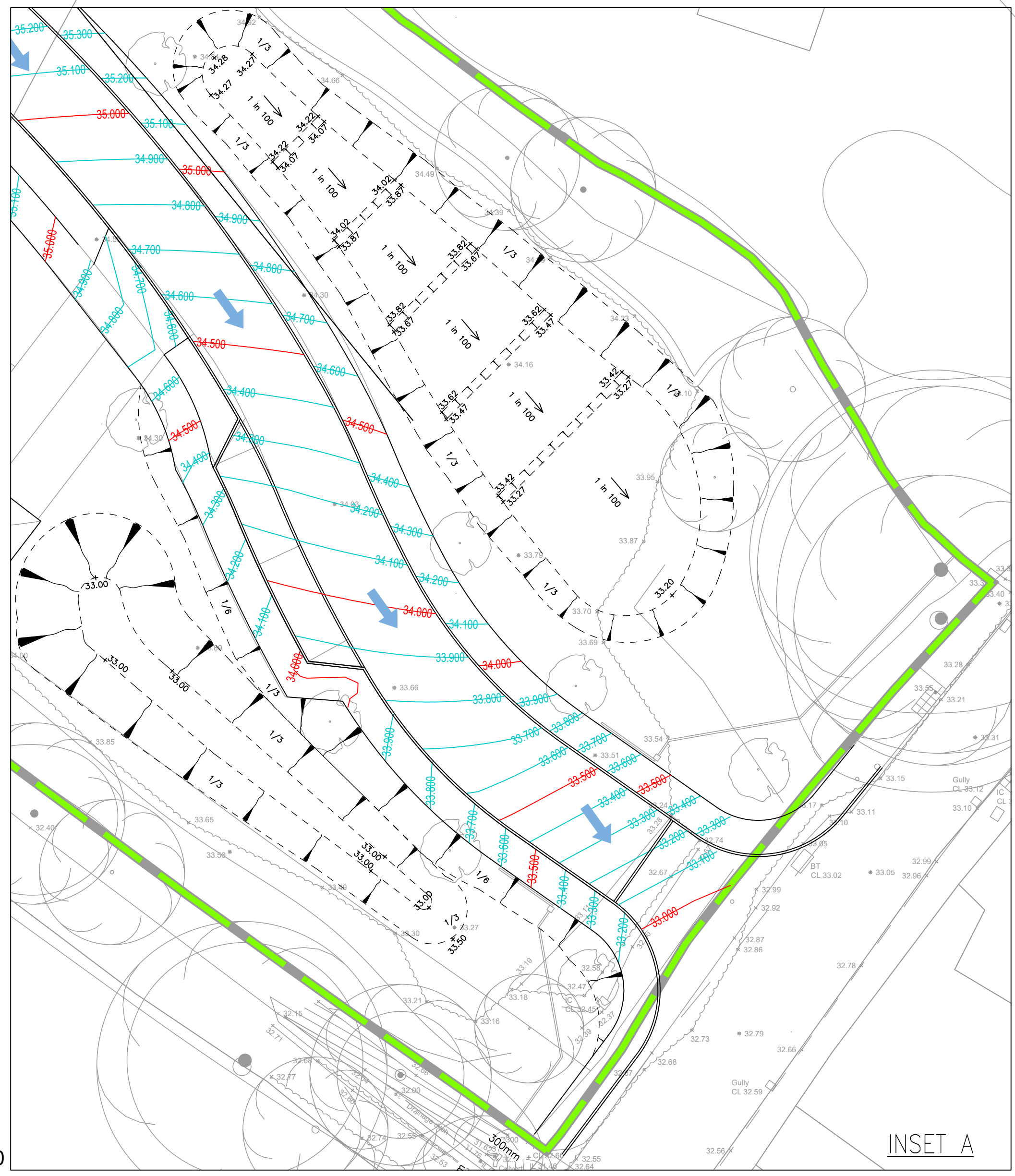
- LEVELS NOTES
1. This drawing to be read in conjunction with all relevant Architects, Engineers and Subcontractors drawings and details.
 2. This drawing is based on topographical survey by Geopoint.
 3. All levels relate to levels given on survey drawing.

LEVELS LEGEND

FFL 59.00
84.80 +
1 in 24.5

Proposed finished floor level
Proposed level
Proposed gradient
Proposed bank and gradient
Denotes extent of retaining wall.
Denotes extent of Gravel Board.

Proposed Contours
Site Boundary
Exceedance flow



FOR CONTINUATION
REFER TO INSET A

PI	INITIAL	ISSUE	REVISION	BY	DATE
1					

DRAWING STATUS
PRELIMINARY

DRAWING TITLE
LEVELS LAYOUT

PROJECT
CHAPEL ROAD, BARNES GREEN

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Oxfordshire, RG9 1AH
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E: mail@simpsoneng.com
W: www.simpsoneng.com

London, Henley-on-Thames and Gloucester

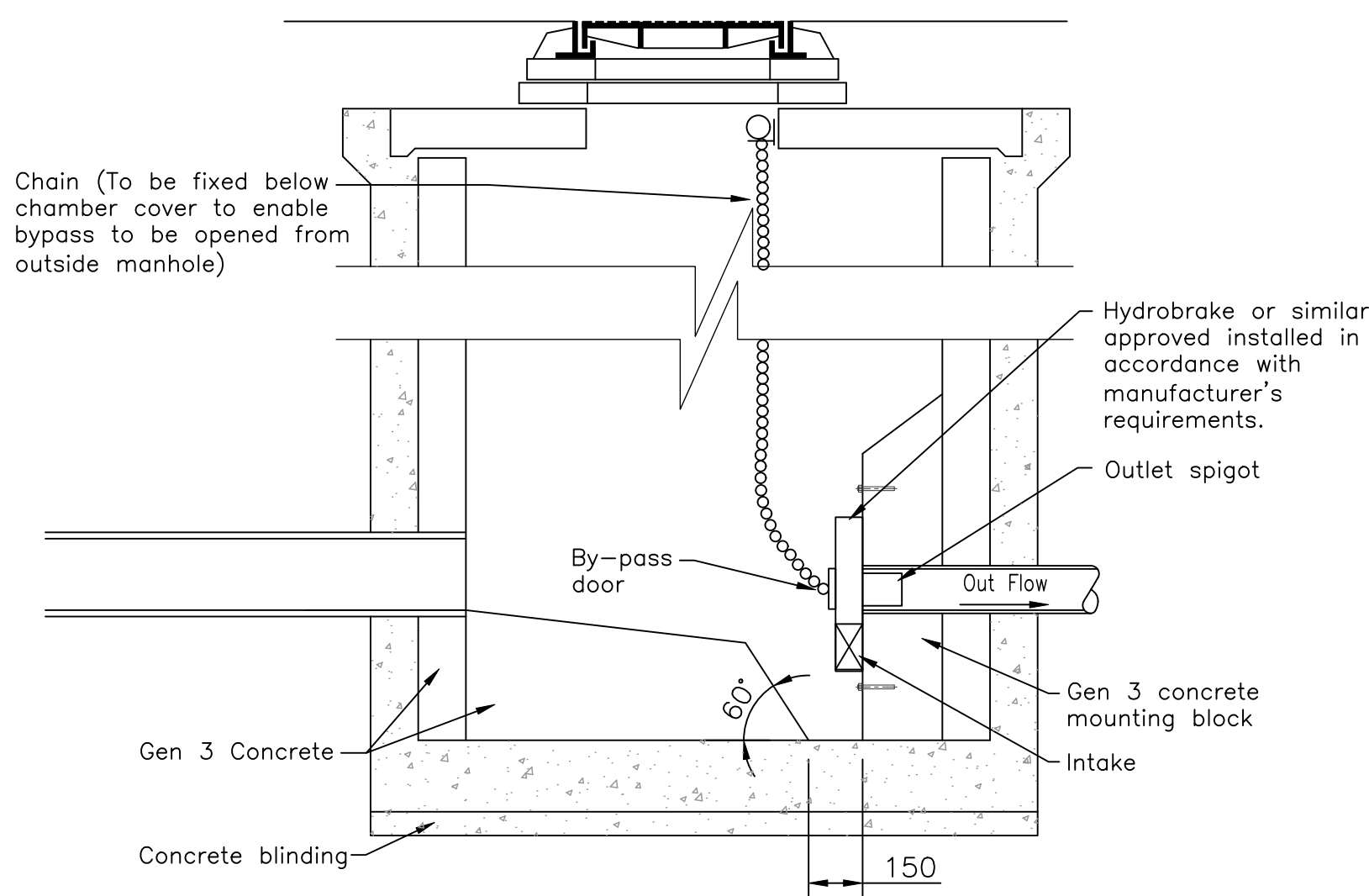
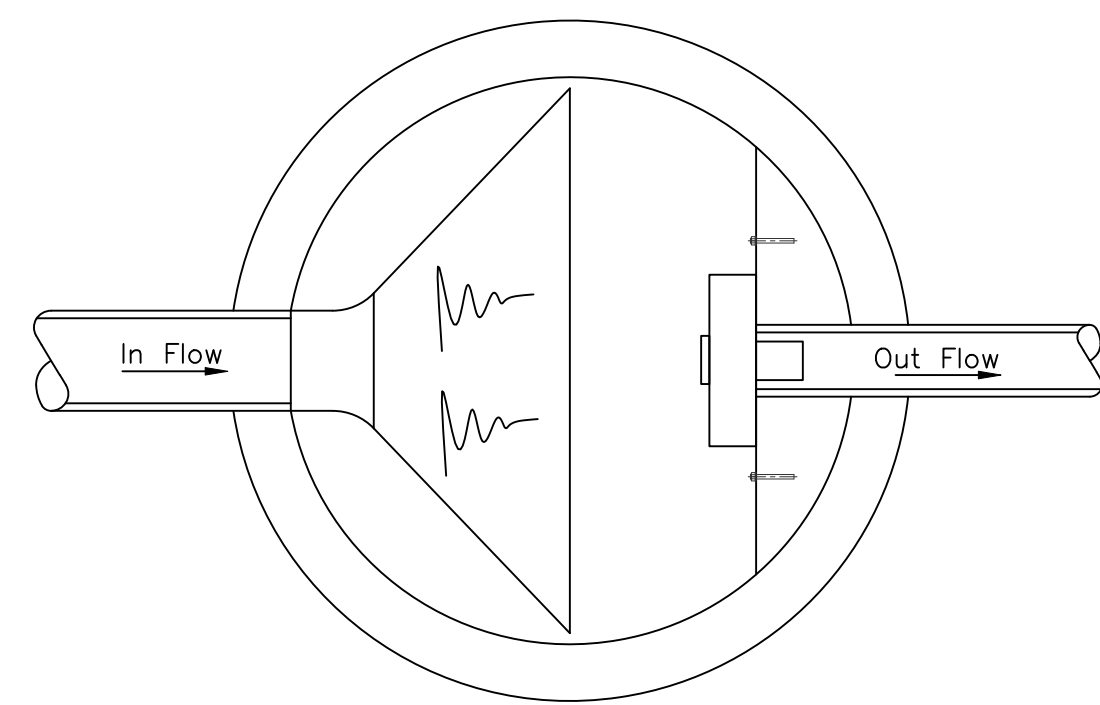
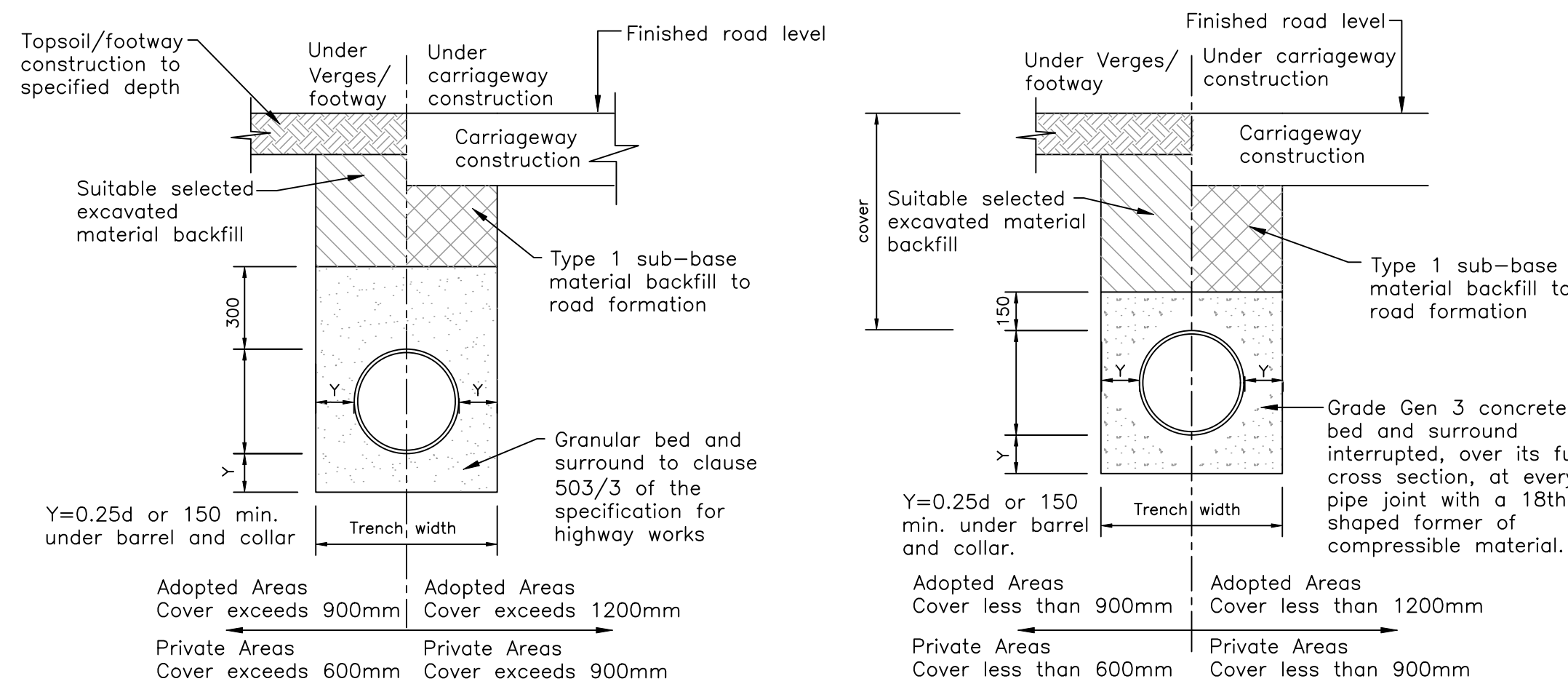
Drawn	Chk'd	Scale	Date
AU	GC	1:200 (B/A)	MAY 2020

Project of Issue
PRELIMINARY

Project Number	Drawing Number	Revision
P25-1183	02	-

Appendix J

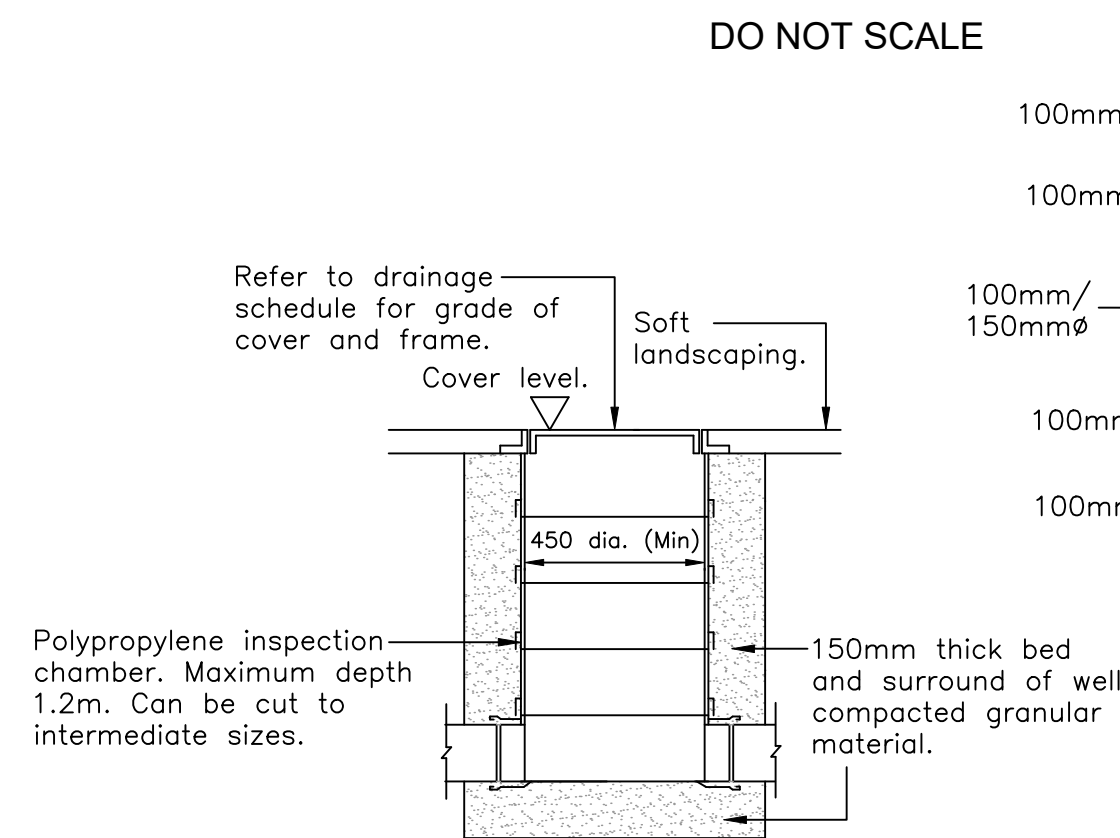
Drainage Construction Details



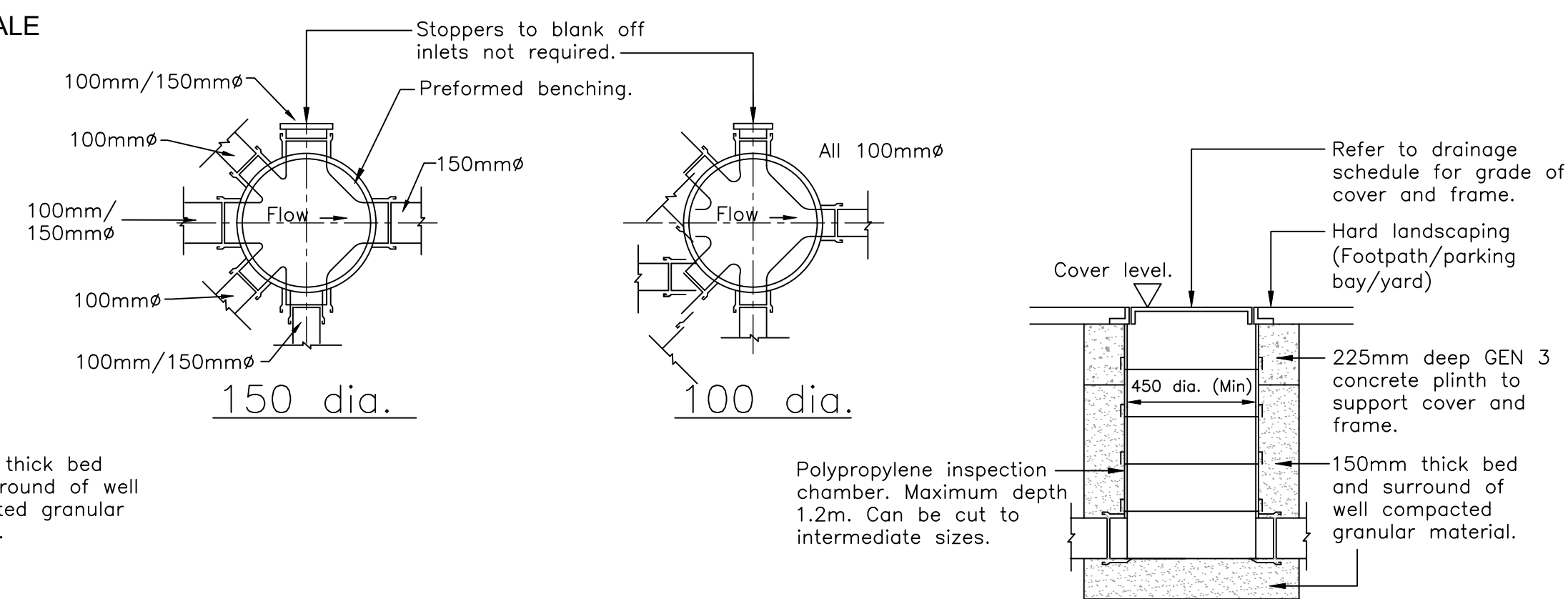
Hydrobrake Chamber (Section)

Notes:

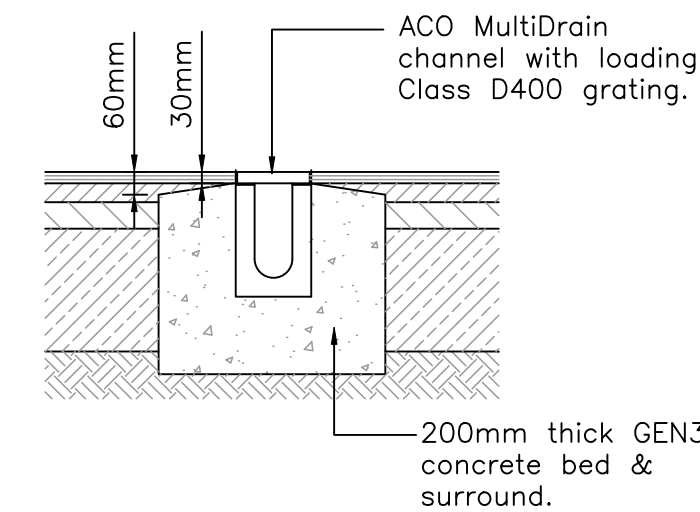
1. Chamber cover to be positioned directly above by-pass door.
2. Dimensions are indicative only and are dependent on type of control device used. Refer to manufacturer's specifications for details.
3. Hydrobrake flow control chamber to limit flows to 9.5 l/s for all storm events up to & including the 1 in 100 year storm plus 40% allowance for climate change.
hydrobrake type – CTL-SHE-0135-9500-1500-9500
design head – 1.5m
orifice diameter – 0.135m
4. Hydrobrake flow control chamber to limit flows to 7.5 l/s for all storm events up to & including the 1 in 100 year storm plus 40% allowance for climate change.
hydrobrake type – CTL-SHE-0120-7500-1500-7500
design head – 1.5m
orifice diameter – 0.120m
5. Hydrobrake flow control chamber to limit flows to 10.5 l/s for all storm events up to & including the 1 in 100 year storm plus 40% allowance for climate change.
hydrobrake type – CTL-SHE-0139-1050-1650-1050
design head – 1.65m
orifice diameter – 0.139m
6. Hydrobrake flow control chamber to limit flows to 3.4 l/s for all storm events up to & including the 1 in 100 year storm plus 40% allowance for climate change.
hydrobrake type – CTL-SHE-0076-3400-1875-3400
design head – 1.875m
orifice diameter – 0.076m
7. For chamber construction details refer to surface water catchpit manhole construction details.



UIC SITED IN SOFT LANDSCAPING



UIC SITED IN HARD LANDSCAPING



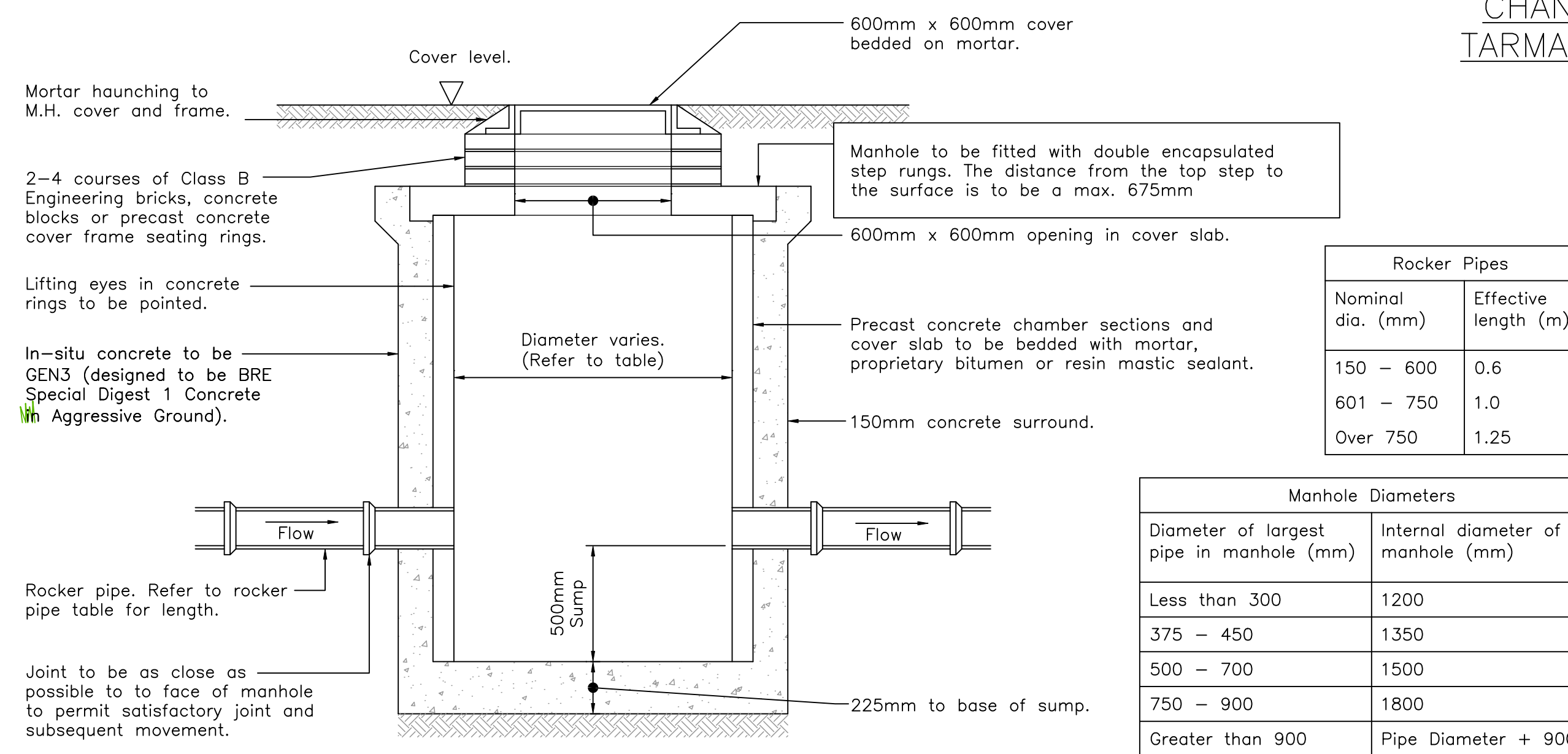
NOTE

Adoptable sewers and manholes to be constructed in accordance with "Design & Construction Guidance", and to the approval of the adopting water authority.

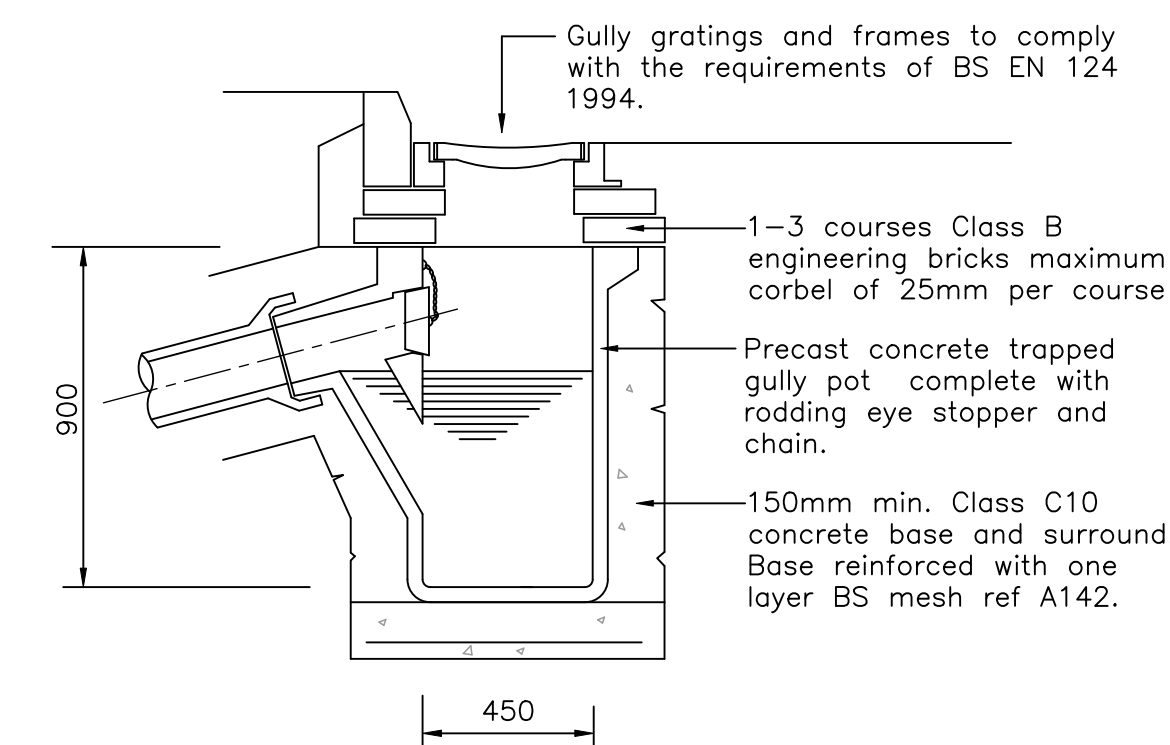
Private drainage to be constructed in accordance with the Building Regulations "Approved Document H"



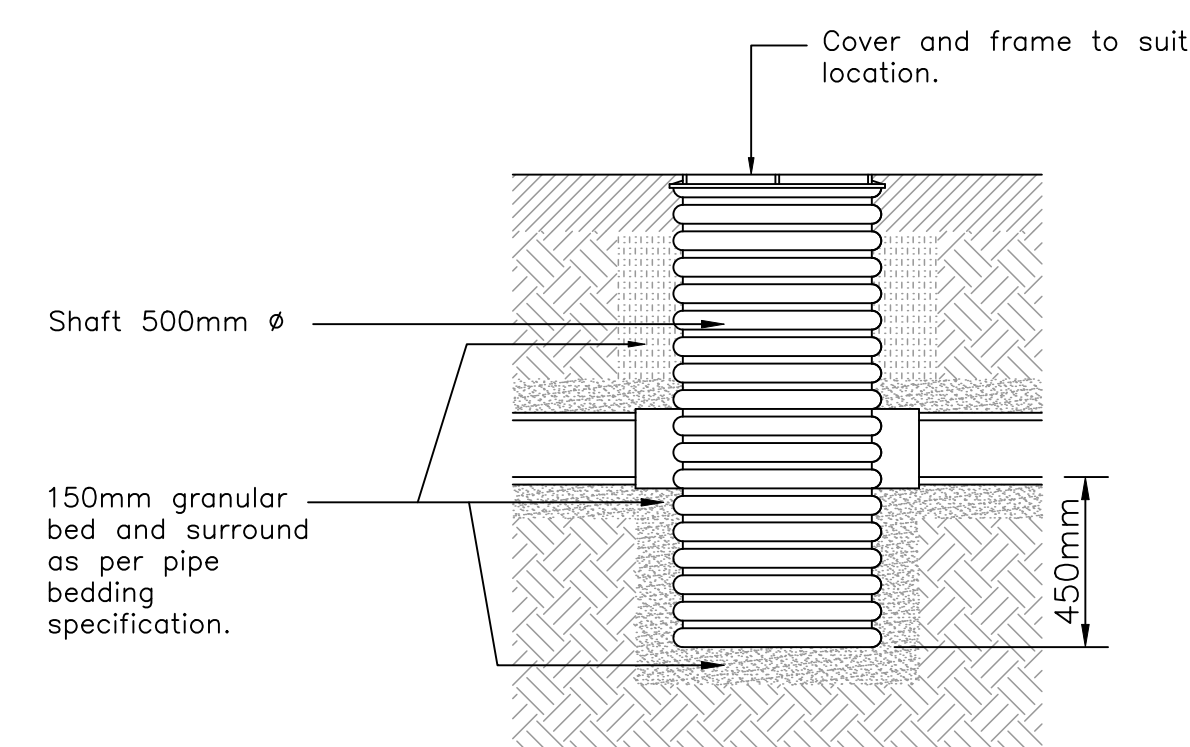
Max. Depth from cover level to invert of pipe 1.2m



CONCRETE CATCHPIT MANHOLE



PRECAST TRAPPED GULLY

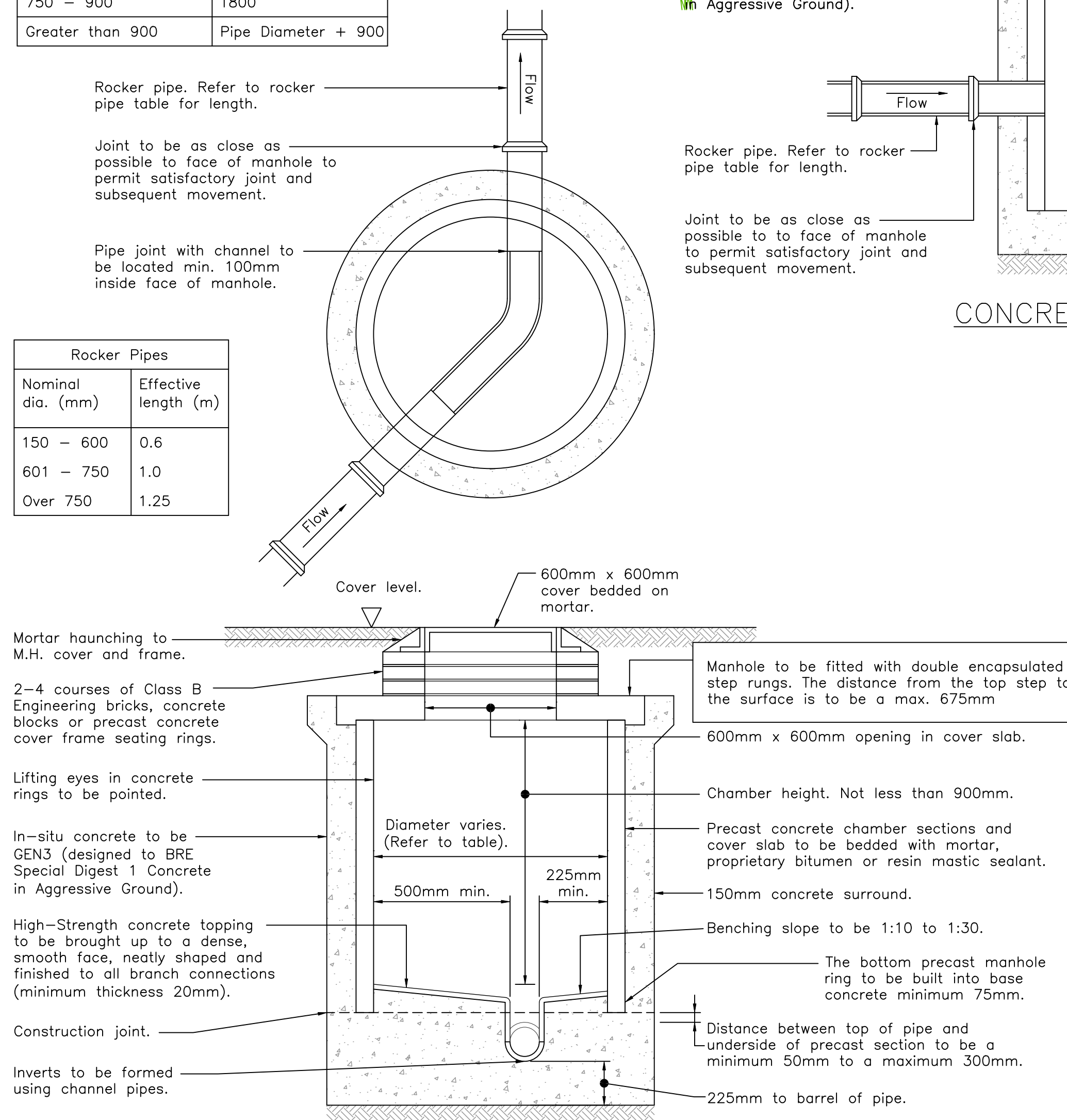


SILT TRAP

N.B TO BE INSTALLED TO MANUFACTURES SPECIFICATION.

Manhole Diameters	
Diameter of largest pipe in manhole (mm)	Internal diameter of manhole (mm)
Less than 300	1200
375 – 450	1350
500 – 700	1500
750 – 900	1800
Greater than 900	Pipe Diameter + 900

Rocker Pipes	
Nominal dia. (mm)	Effective length (m)
150 – 600	0.6
601 – 750	1.0
Over 750	1.25



MANHOLE - TYPE B

Max. depth from cover level to soffit of pipe 3.0m

P1	INITIAL ISSUE	JL	14.05.2
MK	REVISION	BY	DATE

DRAWING STATUS

PRELIMINARY

DRAWING TITLE

DRAINAGE DETAILS
SHEET 1 OF 3

PROJECT

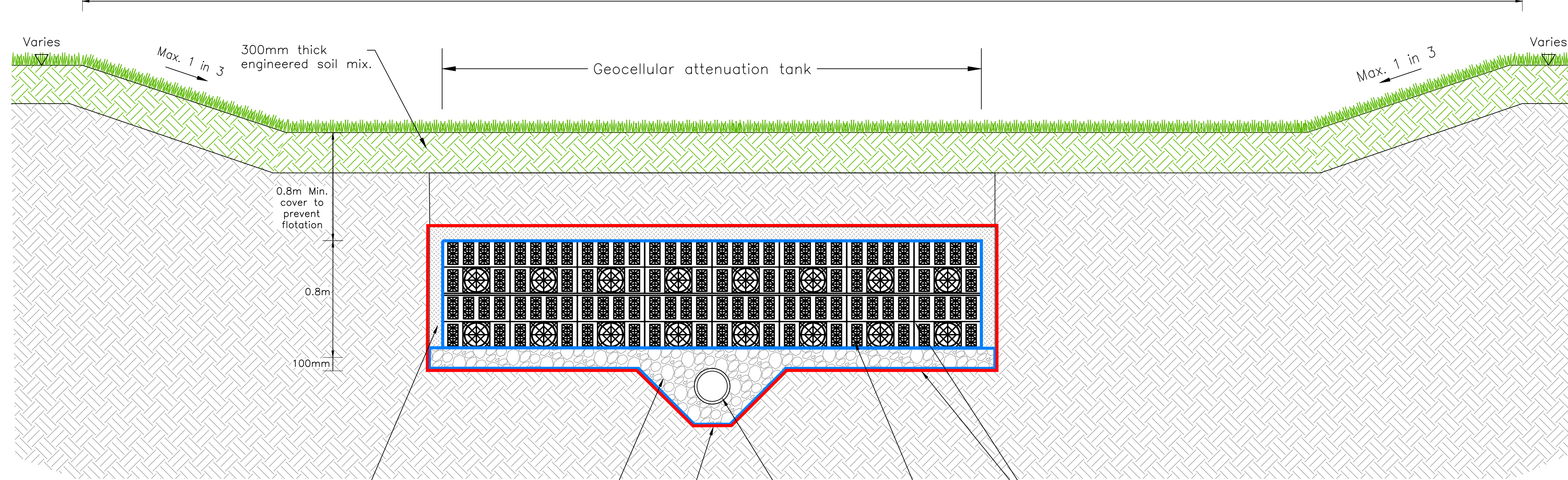
CHAPEL ROAD, BARNES
GREEN



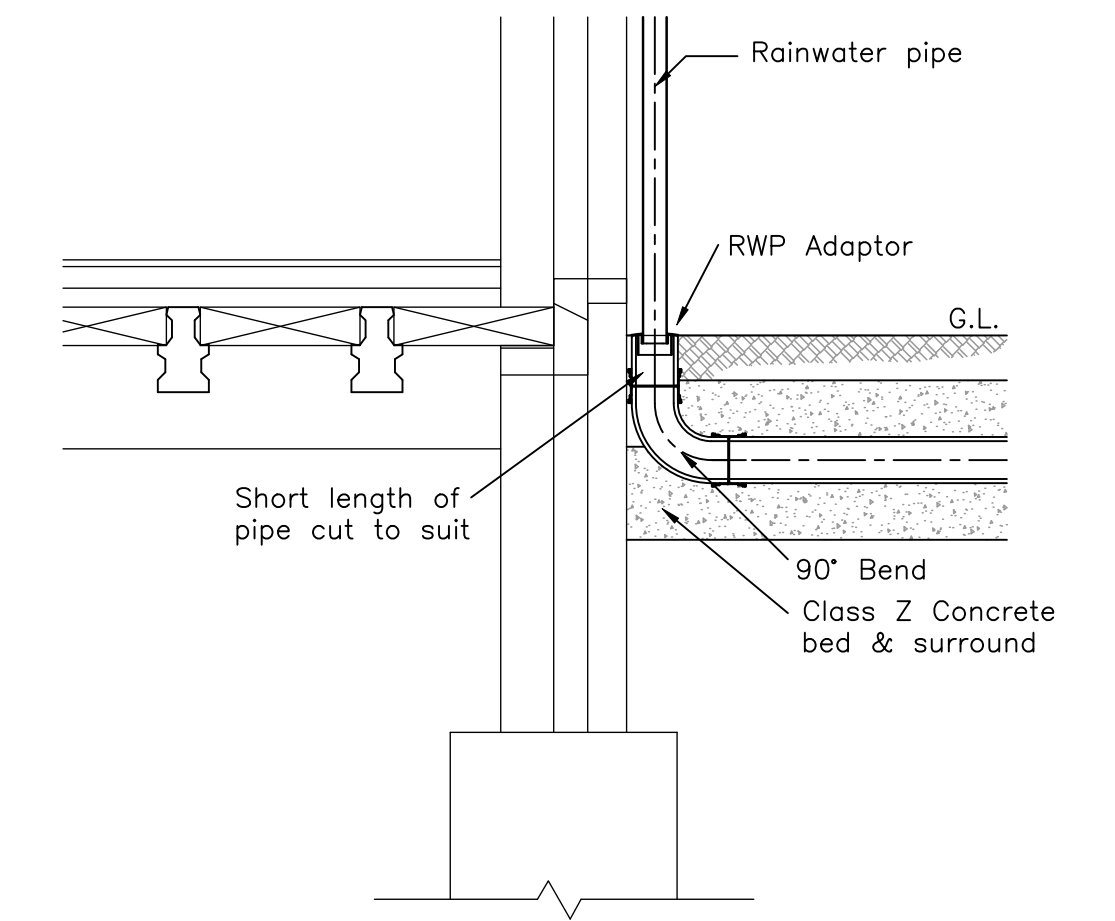
City of London
Gloucestershire County Council

London, Henley-on-Thames and Gloucester

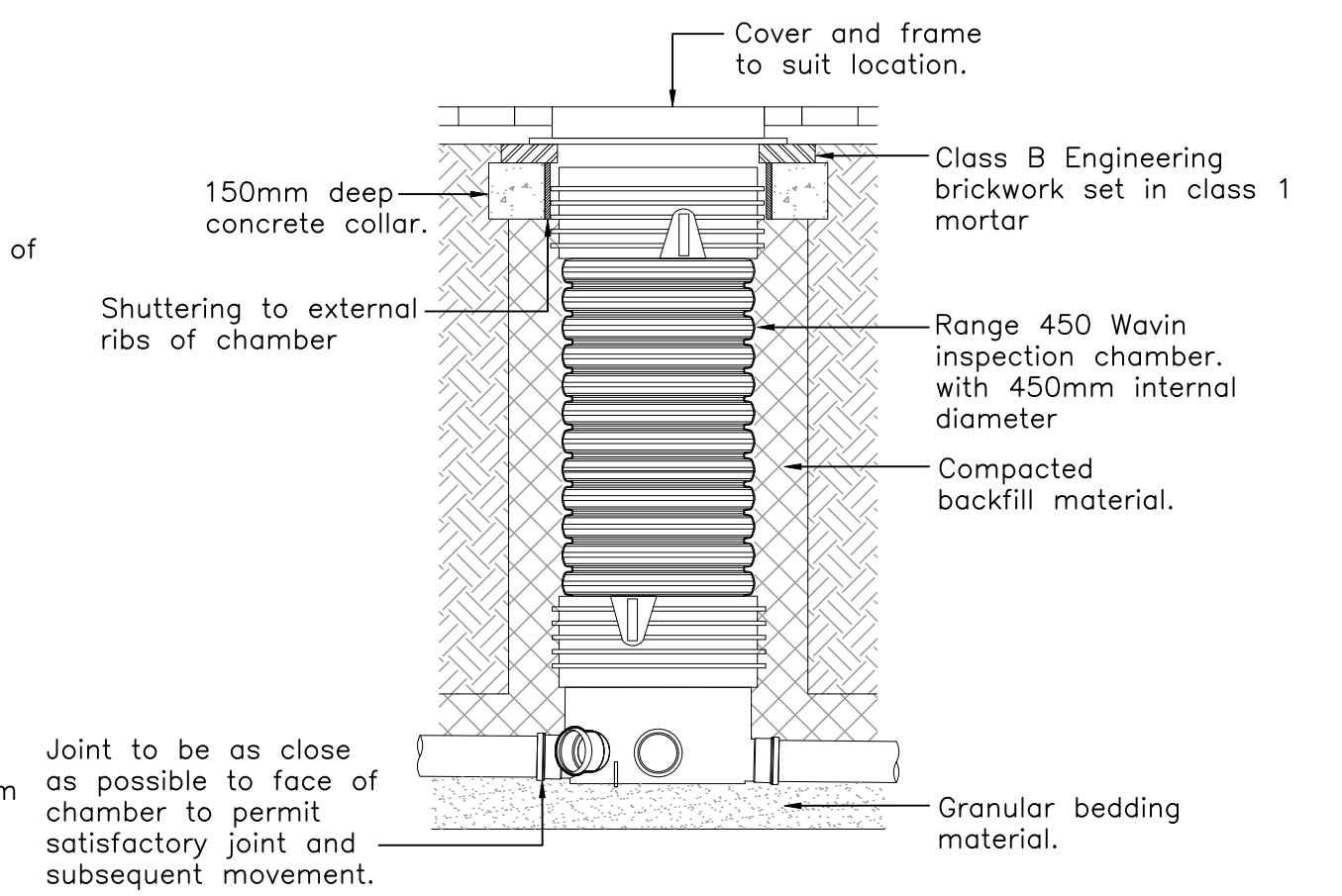
Drawn JL	Ch'kd AU	Scales 1:20 @ A1	Date MAY 2026
Purpose of Issue PRELIMINARY			
Project Number P25-1183		Drawing Number 10	Revision P1



SECTION THROUGH PROPOSED DETENTION BASIN AND GEOCELLULAR ATTENUATION TANK



EXTERNAL RAINWATER PIPE CONNECTION DETAIL



TYPICAL WAVIN RANGE 450 INSPECTION
CHAMBER DETAIL

NOTE

Adoptable sewers and manholes to be constructed in accordance with "Design & Construction Guidance", and to the approval of the adopting water authority.

Private drainage to be constructed in accordance with the Building Regulations "Approved Document H".

P1	INITIAL ISSUE	JL	14.05.26
MK	REVISION	BY	DATE

DRAWING STATUS

PRELIMINARY

DRAWING TITLE

DRAINAGE DETAILS SHEET 2 OF 3

PROJECT

CHAPEL ROAD, BARNES
GREEN



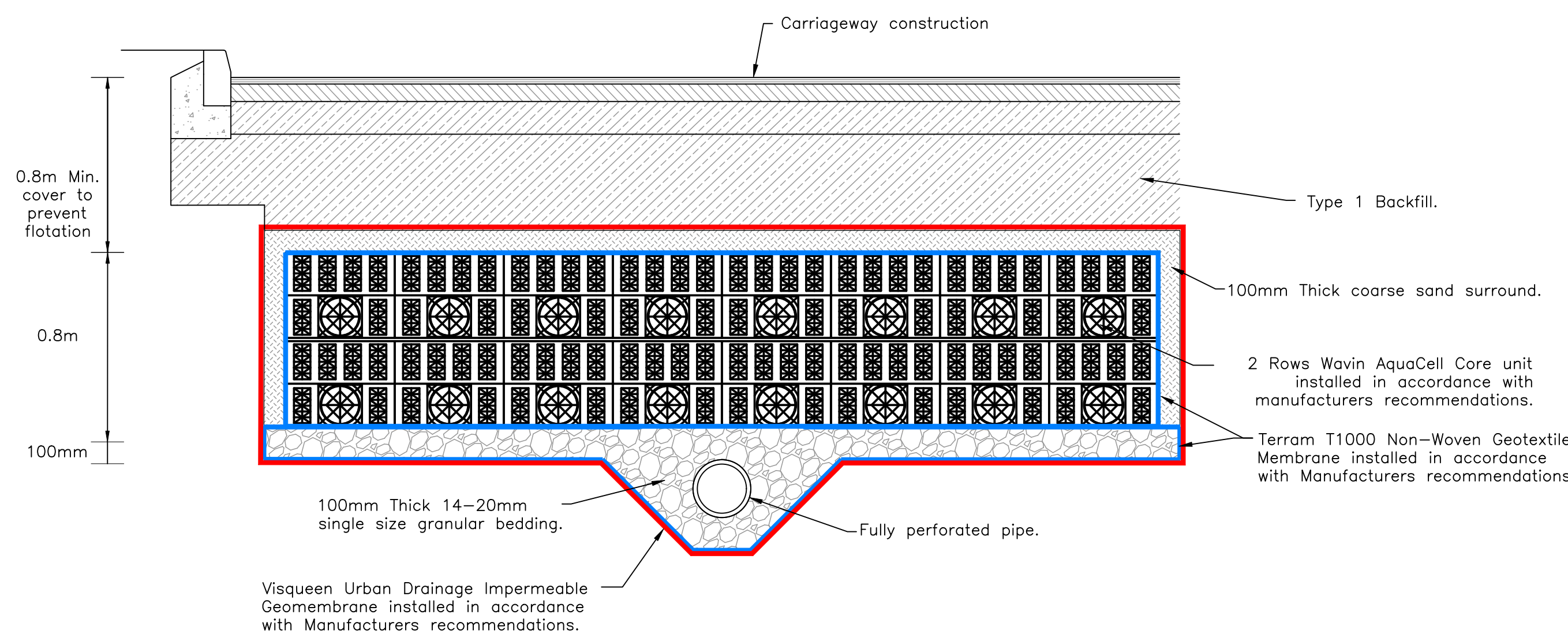
London, Henley-on Thames and Gloucester

Drawn JI	Ch'kd AU	Scales 1:20 @ A1	Date MAY 2026
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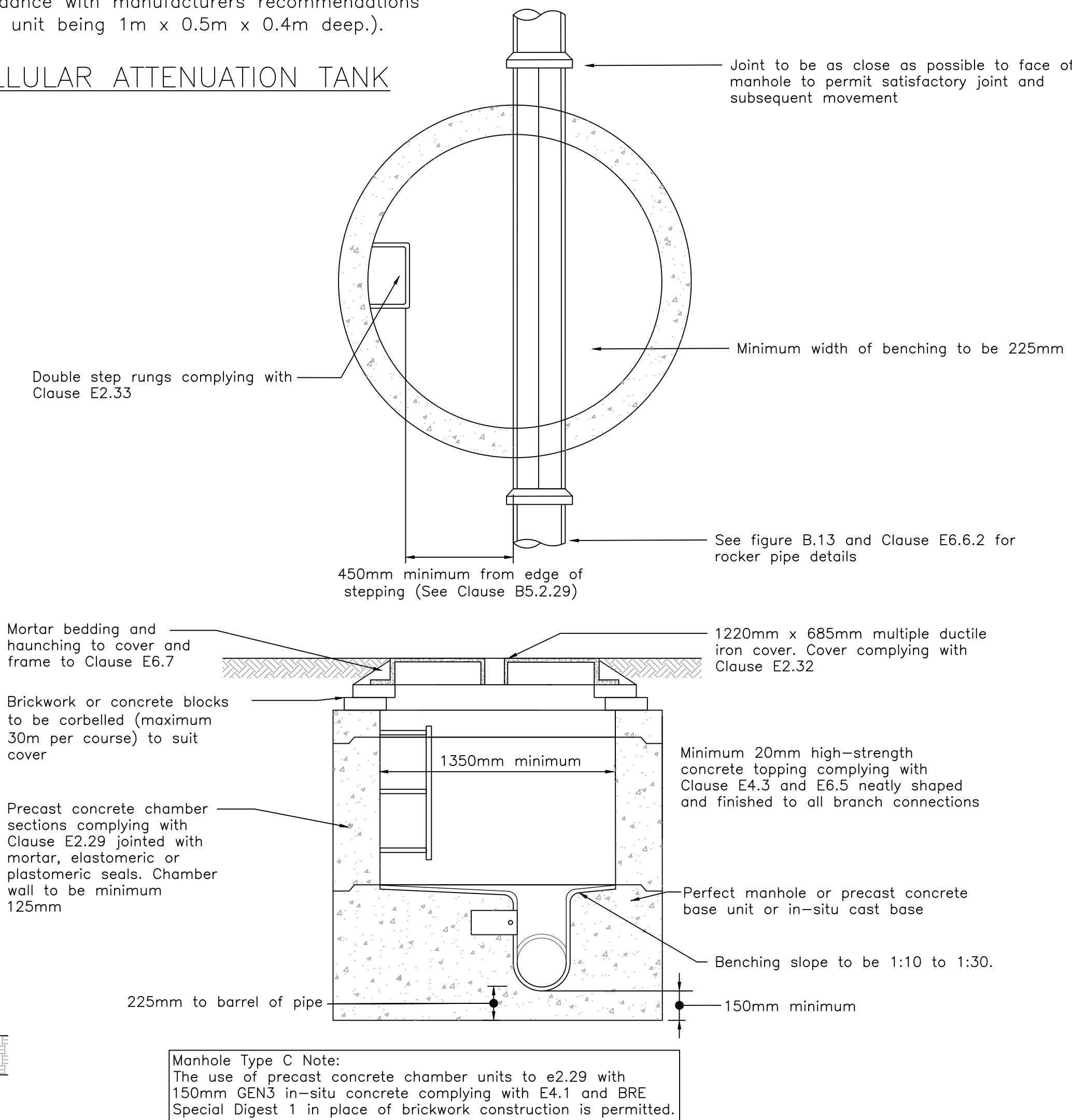
Purpose of Issue	PRELIMINARY
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Project Number	DSE 1100	Drawing Number	11	Revision	
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P25-1183	11	P1
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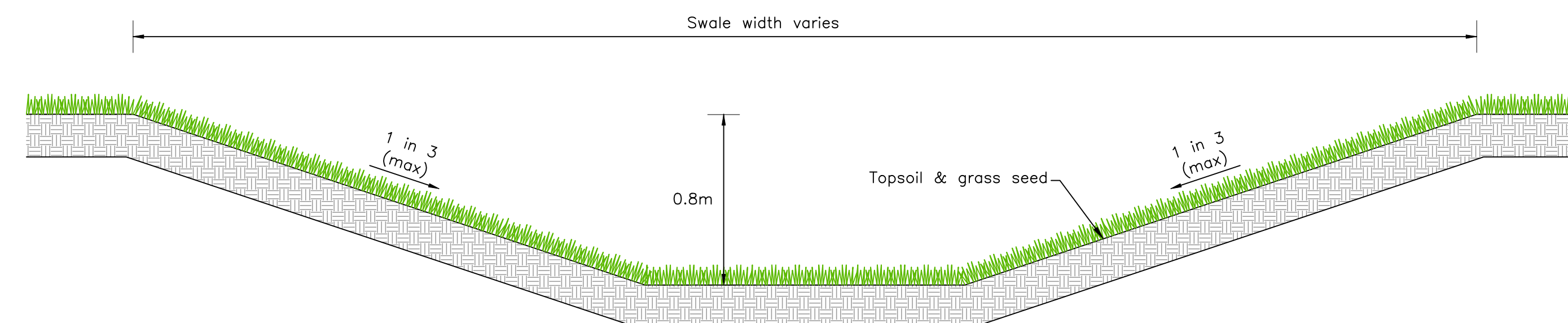


TYPICAL SECTION THROUGH BELOW GROUND GEOCELLULAR
ATTENUATION TANK BELOW ROAD

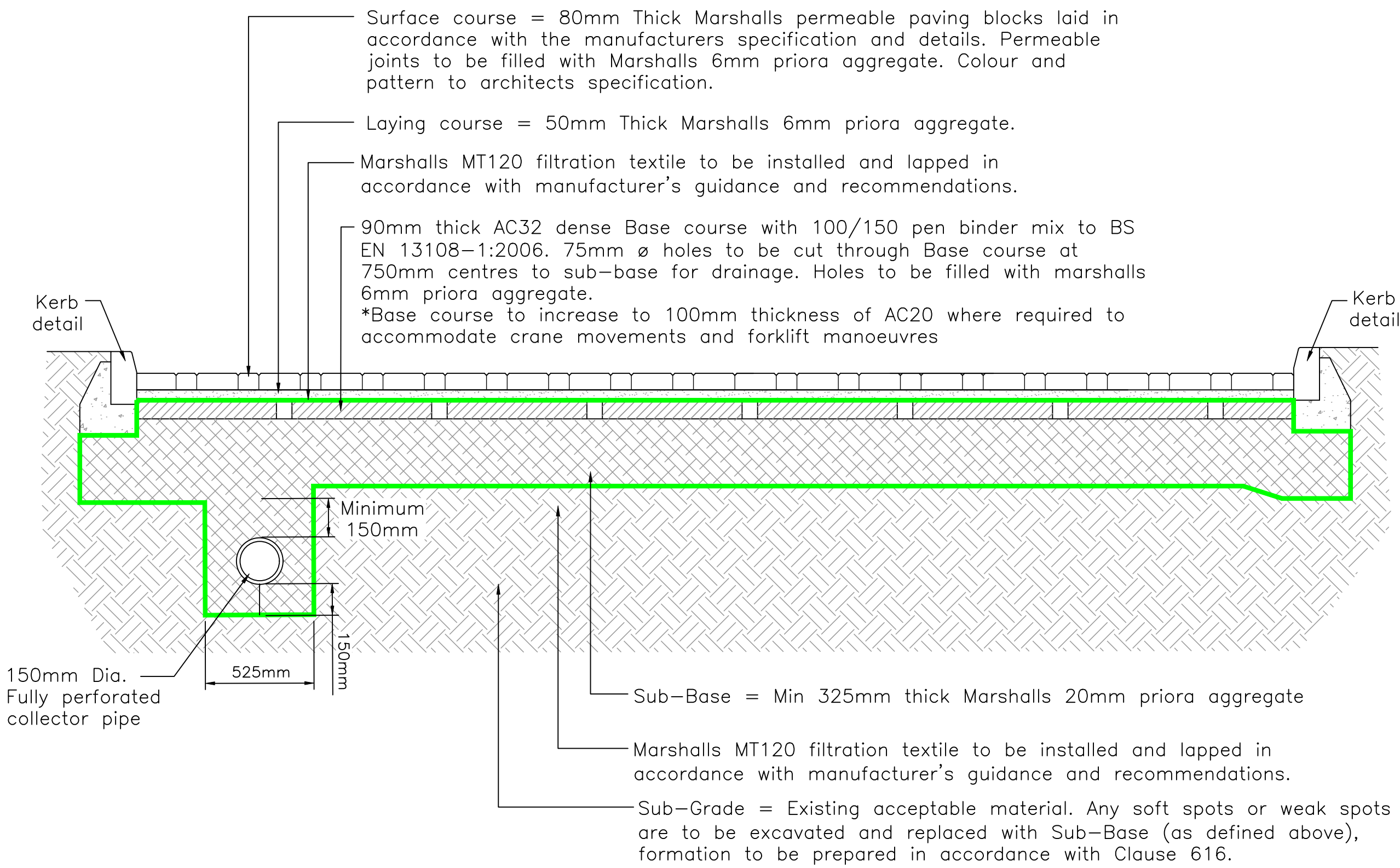


MANHOLE — TYPE C

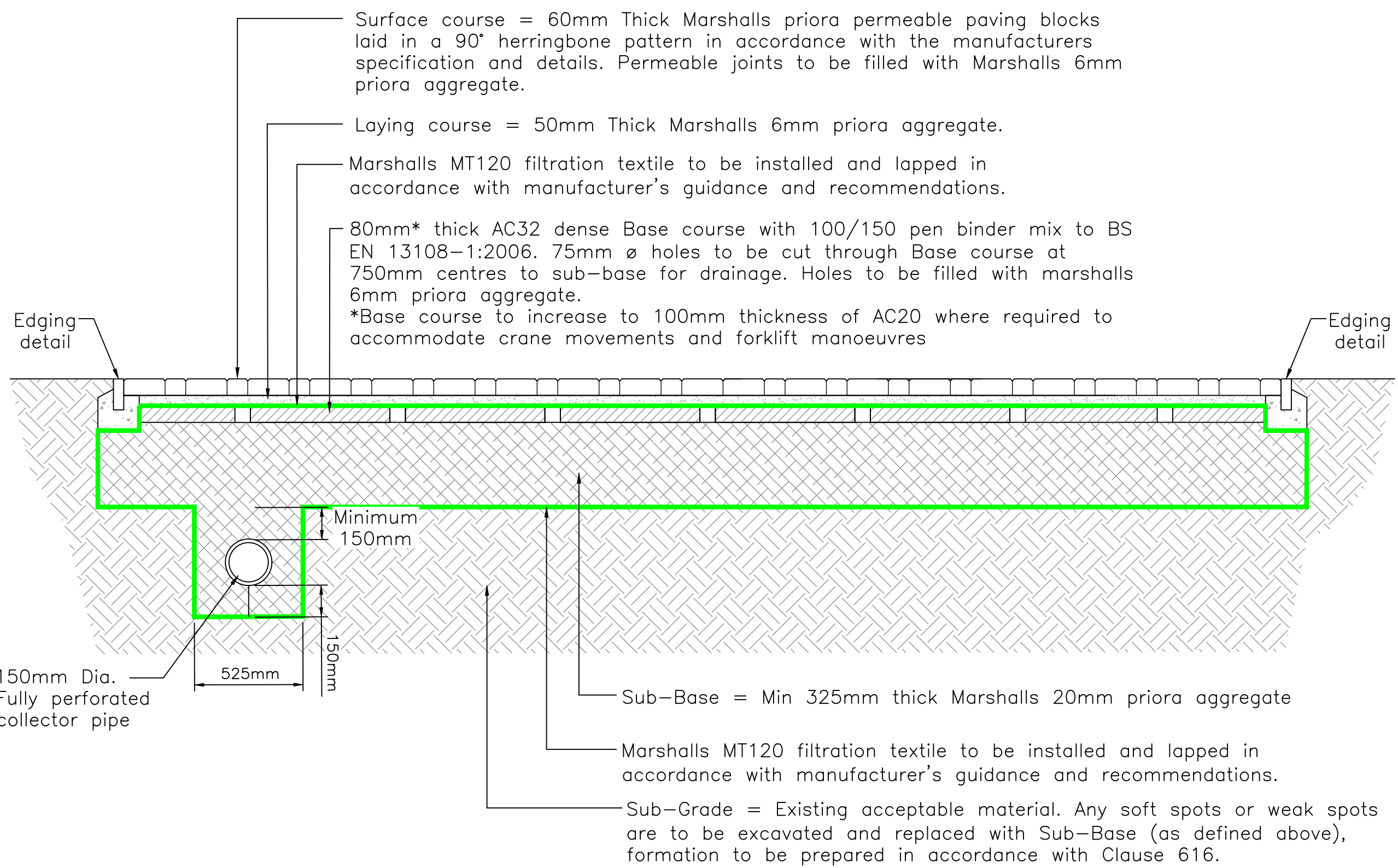
Max. Depth from cover level to soffit of pipe 1.5m



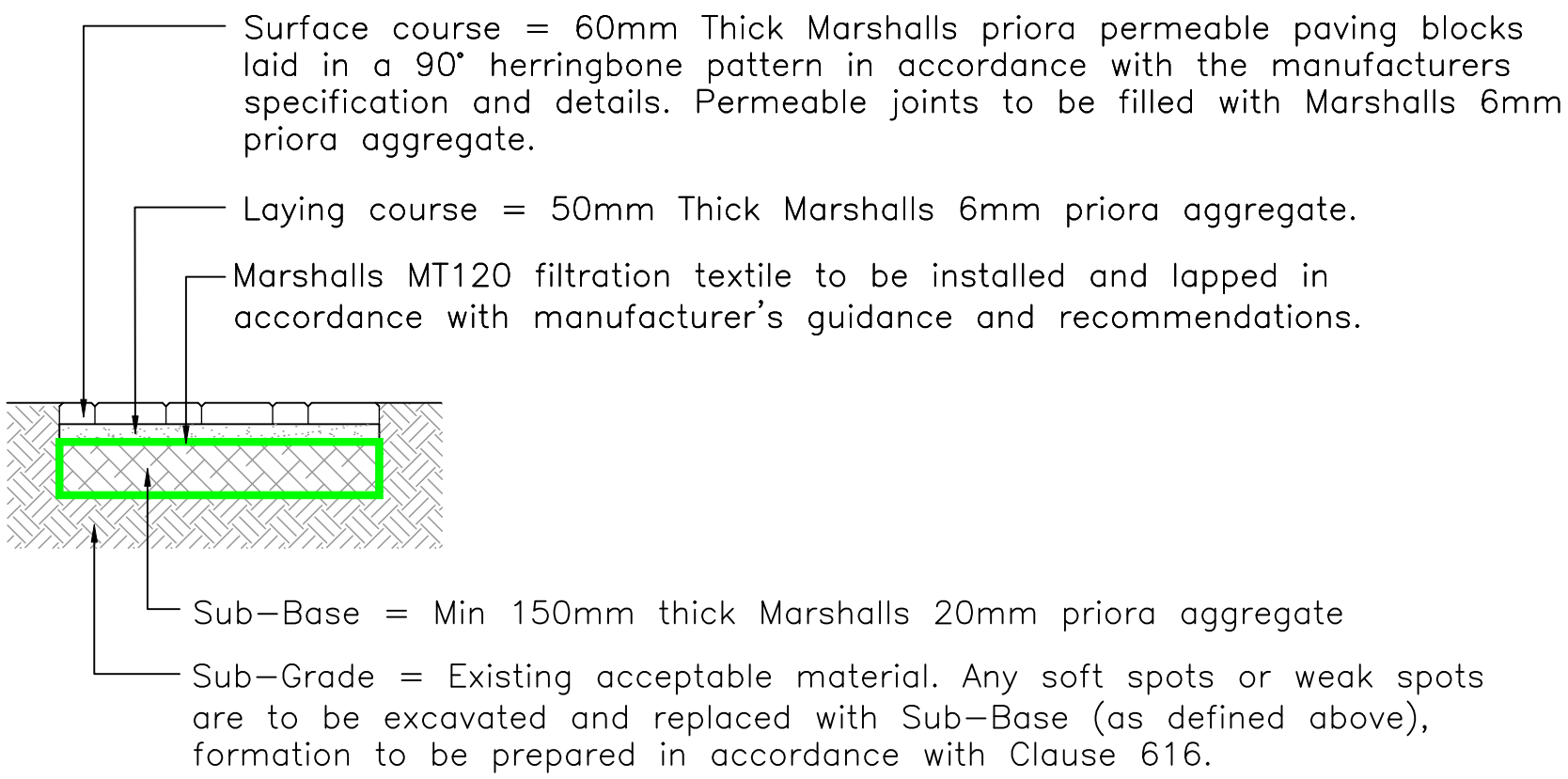
TYPICAL SECTION THROUGH SWALE



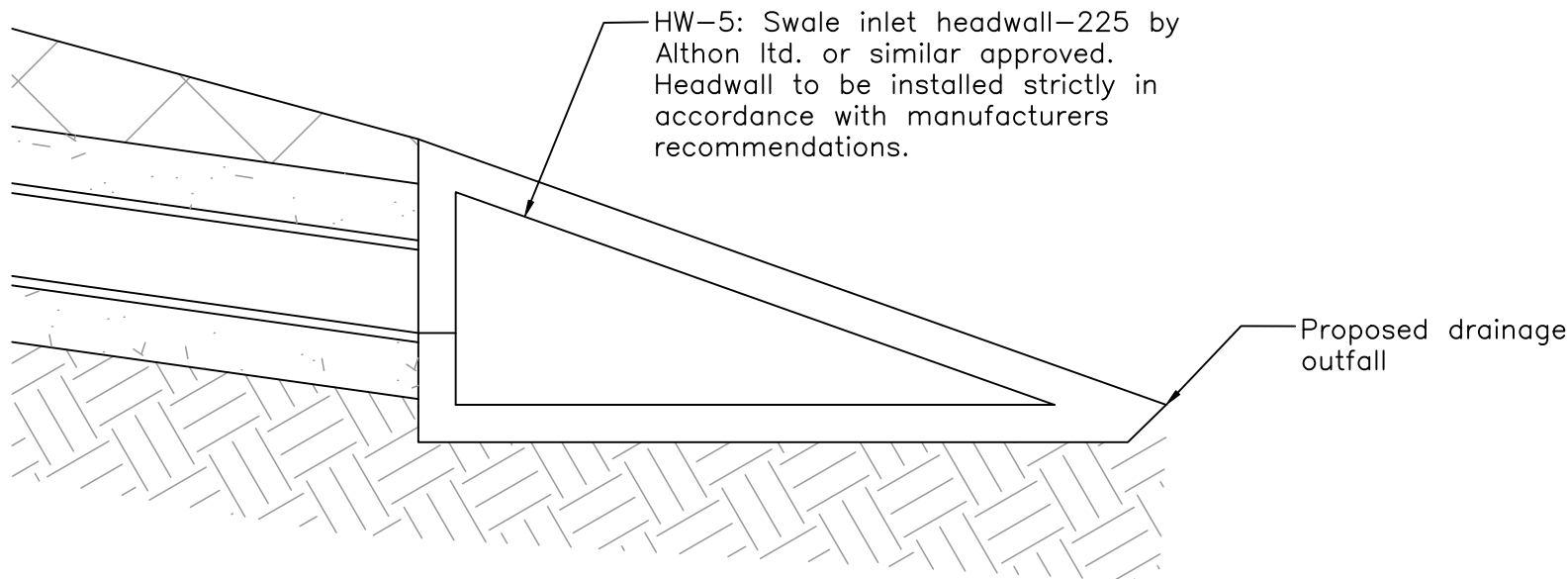
TYPICAL SECTION THROUGH PERMEABLE BLOCK PAVED ACCESS ROAD



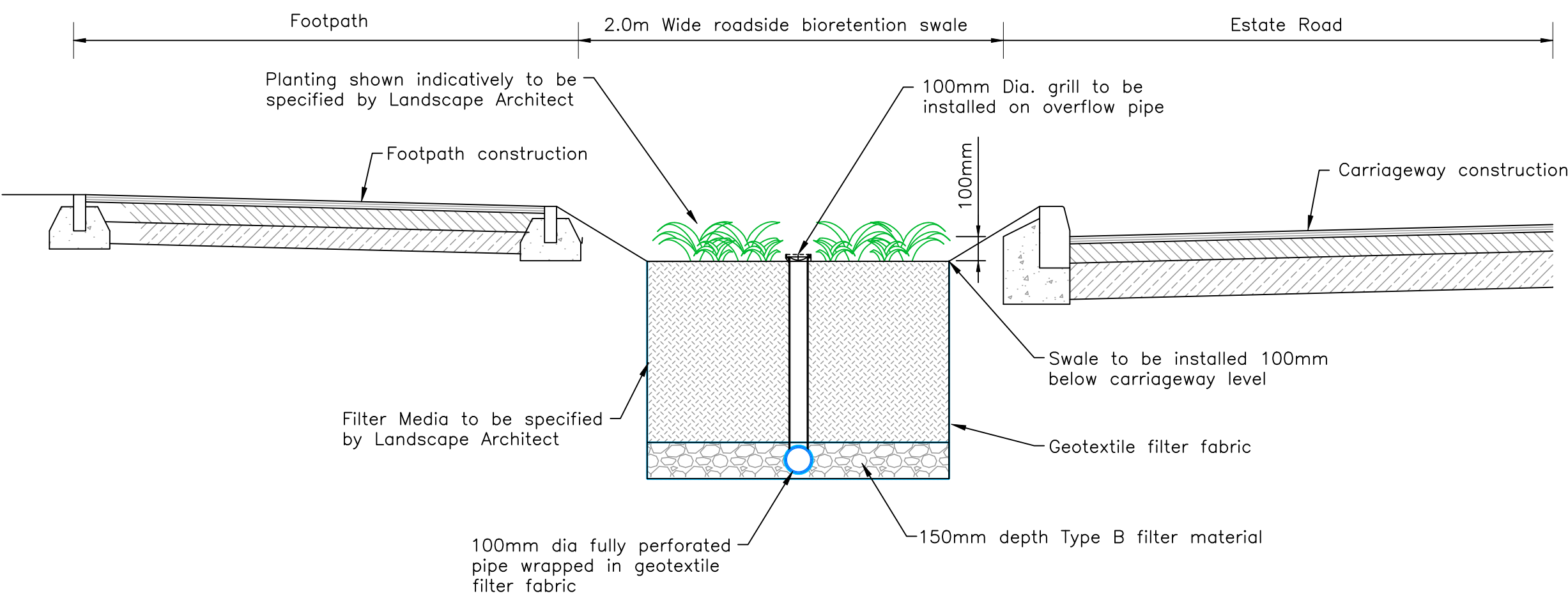
TYPICAL SECTION THROUGH PERMEABLE BLOCK PAVED DRIVEWAYS



TYPICAL SECTION THROUGH PERMEABLE BLOCK PAVED PATIO



TYPICAL SECTION THROUGH ALTHON SWALE INLET HEADWALL



TYPICAL SECTION THROUGH ROADSIDE BIORETENTION SWALE

P1	INITIAL ISSUE	JL	14.05.26
LMK	REVISION	BY	DATE

DRAWING STATUS	
PRELIMINARY	

DRAWING TITLE	
DRAINAGE DETAILS SHEET 3 OF 3	

PROJECT	
CHAPEL ROAD, BARNES GREEN	

London, Henley-on Thames and Gloucester	
Drawn JL	Ch'd AU
Scales 1:20 @ A1	Date MAY 2026

Purpose of Issue	
PRELIMINARY	

Project Number P25-1183	Drawing Number 12	Revision P1
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Appendix K

Construction Surface Water Management Plan

Chapel Road, Barnes Green

P25-1183
ISSUE: 01

Construction Surface Water Management Plan

Chapel Road, Barnes Green

Construction Surface Water Management Plan

SIM Reference	P25-1183
Project Address	Chapel Road, Barnes Green, West Sussex, RH13 0PS
Document Reference	P25-1183 – Construction Surface Water management Plan – Issue 01.
Client	Shanly Homes
Purpose	For Planning
Issue	01
Author	Jl
Reviewed By	AU
Office	Henley-On-Thames
Date	14/05/2026

Revision	Summary of Revision	Date
01	First issue	14/05/2026
-	-	--/--/--
-	-	--/--/--

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Contents

- 1 Introduction 1
- 2 Site Locations & Characteristics 2
- 3 Sensitive Receptors 3
- 4 Surface Water Management within Active Development Area..... 4
- 5 Surface Water management within non-Active Development Area 6
- 6 Ongoing Site Maintenance..... 7
- 7 Monitoring Procedures and Reports..... 8
- Appendices and References 9

1 Introduction

- 1.1 This document has been prepared by Simpson TWS on behalf of Shanly Homes. to provide details of surface water management during the construction phase of the development and for the drainage proposals identified on Surface Water Drainage drawing ref. P25-1183-01
- 1.2 This document follows current legislation and guidance and details the measures and methods which should be implemented during the construction period to ensure surface water is managed suitably, with the site and areas downstream protected. It also provides recommended measures and good practice which should be incorporated, to ensure the constructed drainage network and SuDS features will be fully operational on completion of construction and handover, with the aim of reducing any necessary remedial works.
- 1.3 It is recommended the following measures are implemented, to aid awareness and bring existing site documentation up to date:
 - Undertake additional detailed site-based awareness training (Toolbox Talk) on silt management and protection for all site staff including the groundworker;
 - Include a detailed section relating to silt protection within the site induction folder; and
 - Undertake a weekly site audit, maintain a written and photographic record of the audits and obtain support from the appointed environmental consultant if or when required.

2 Site Locations & Characteristics

- 2.1 The site is located in Barns Green, west of Chapel Road, between Muntham Drive and Smugglers Lane. Figure 2.1, below shows the site location outlined in red. The site is centred on Ordnance Survey grid reference TQ 12533 27135 and co-ordinates X: 512533; Y: 127135. The nearby post code is RH13 0PS.



Figure 2.1 Site Location

- 2.2 The site is presently an undeveloped green field used for pasture, approximately 1.88 Ha in area.
- 2.3 To the East of the site is Chapel Road, beyond which are residential properties, a primary school, a pub and a [post-office. To the North of the site is a village hall and social club. To the west and south of the site is further undeveloped green field.
- 2.4 The site falls in a south-easterly direction, from a level of approximately 43.50 mAOD at the north-western boundary to approximately 32.50 mAOD at the south-eastern boundary.

3 Sensitive Receptors

3.1 During the construction phase, the potential for pollution from surface water runoff is increased during the earthworks phase. The required movement and storage of soils, along with increased soil compaction and vehicle movements can result in polluted runoff. The perceived pollution from surface water runoff is generally attributed to the movement of sediment / silt which can become suspended within flows following heavy rainfall or during construction activities i.e. dewatering excavations.

3.2 The areas on-site and off-site which are considered as sensitive receptors to silt are identified below.

On-site:

- The mature trees and hedges that boarder the perimeter of the site
- The drains, linear drainage, and surface water sewers of the drainage system (upon installation)
- SuDS features (upon installation)

Off-site:

- Chapel Road gullies to the east of the site.
- Existing ditch along southwest boundary of the site.

4 Surface Water Management within Active Development Area

- 4.1 The following section sets out the protection measures and good practice which should be implemented on all active development areas of the site to protect the surface water system and sensitive receptors defined in section 3.
- 4.2 The surface water drainage network, associated outfalls / flow controls, and SuDS will be constructed at an early stage of the development's programme as part of the earthworks phase. During construction, this will assist in managing runoff and help settle out the high volumes of sediments created during construction.
- 4.3 Topsoil and seeding of SuDS would not take place until site works have been completed and the maintenance period commenced. During the construction period, the surface of SuDS would be lined with a geotextile filter fabric that will trap silt and prevent it from entering the existing lake. Prior to laying topsoil, the geotextile filter fabric will be inspected, and replaced, if found to be damaged or heavily contaminated with silt. It is recommended the SuDS checklist, Table 1 included in Appendix A is completed during the construction of the basin. This will ensure the SuDS are built to the specified design and if changes are required due to differing site conditions, these can be picked up for as built changes and the design can be confirmed.
- 4.4 It is not always possible to ensure that new impermeable areas are immediately connected to the drainage system. Therefore, the following additional measures will be implemented to ensure construction runoff is appropriately managed on-site:
- Protective coverings would be used to help prevent runoff stripping material stockpiles
 - Plant and wheel washing would take place in a designated location. The area would be tanked and not allowed to discharge into the drainage system or infiltrate into the ground. Effluent should be treated as contaminated waste and disposed off site by a licensed waste management operator.
 - Surfaces used as access roads and storage areas during construction should be swept regularly to prevent accumulation of dust and mud.
 - It is likely that groundwater will be encountered in excavations. Such water would not be discharged to the drainage system until the amount of suspended solids has been reduced through the controlled use of skips or tanks, which will act as stilling basins. Other methods which could be employed are products such as filter bags / boxes or similar as shown in *Appendix B*.
 - Where dewatering is required, consideration should be given to over-pumping to a vegetated area away from sensitive receptors to allow infiltration. If over-pumping into the surface water system is proposed, ensure any necessary permits and adequate protection measures are in place. The implemented measures should be frequently monitored and maintained to prevent discharge of silt into the drainage system.
 - To prevent contamination associated with the use of oils and hydrocarbons during construction, the Contractor would ensure that the following precautionary measures are employed during construction:
 - Regular maintenance of machinery and plant.
 - Use of drip trays.
 - Regular checking of machinery and plant for oil leaks.
 - Use of correct storage facilities.
 - Specific procedures are followed when refuelling.
 - Use of a designated area for refuelling.
 - Emergency spill kit to be located near refuelling area.
 - Regular emptying of bunds.

- Tanks should be located in secure areas to stop vandalism.
- 4.5 The proposed drainage system shall incorporate catchpits fitted with debris interception measures equivalent to gully guards. This will help to ensure that silt is removed from waters entering the constructed surface water network and reduce the need for remedial works at a later stage.
- 4.6 Silt fences should be implemented in areas where ground levels fall towards sensitive receptors identified in section 3 or where considered required. An example of silt fence systems and guidance on installation is included in Appendix B.
- 4.7 Upon completion, all underground pipework would be jet cleaned and CCTV surveyed and silt / debris present in SuDS would be removed. The Contractor would be responsible for rectifying any significant defects identified at this stage and for a period of approximately 12 months thereafter. At the end of this period a further inspection will be carried out by the Contract Administrator and on completion of any outstanding remedial works, the drainage system would be handed over.

5 Surface Water management within non-Active Development Area

5.1 The following protection measures should be implemented on all non-active development areas to protect the surface water system.

- Minimise vegetation removal within non-active development areas;
- Prevent movement of any plant equipment across non-active development areas, which may cause disturbance to existing surface cover and cause compaction, which in turn will reduce the potential for infiltration

6 Ongoing Site Maintenance

6.1 The following site maintenance activities should be continually adopted during construction of the development.

- On site storage / availability of silt fencing, silt matting and straw bales to enable deployment at short notice if required (i.e. during inclement weather) and to facilitate ongoing maintenance of potential installations and;
- Removal of residual silt which may have accumulated at installed protection measures, i.e. behind silt fencing

7 Monitoring Procedures and Reports

- 7.1 Over the course of the construction period, it may be necessary to implement other protective measures where site conditions and levels change or as a result of extreme weather events. Monitoring will help to ensure areas where additional measures may be required, are identified and enable mitigation measures to be implemented.
- 7.2 The following monitoring procedures should be carried out on a monthly basis by the site team to enable continuous review inline with the measures outlined in Section 4. A comprehensive record of the effectiveness of the system will then be maintained to enable further review by any parties attending site. Monitoring of the following on a weekly basis and daily during periods of heavy rainfall.
- Monitoring location M1: Monitor the condition of off-site roads at the site entrance to ensure it remains clean and free from large amounts of dirt and dust
 - Monitoring location M2: Monitor the condition of surface water being discharged to SuDS
- 7.3 Gullies, linear drainage channels and manholes should be inspected to monitor the flows entering the surface water system using the Table 4 inspection form included in Appendix D. Maintenance, cleaning and replacement of linear drainage channel protection, and all silt entrapment materials (whichever are utilised) as required. A photographic log and written record of monitoring using the site inspection form Table 5 within Appendix D on a weekly basis should be kept, which will assist in documenting any changes on site and identifying any changes needed to the protection systems as the development progresses. All records will be reviewed on a quarterly / as required basis.

Appendices and References

Appendix A	Inspecting and Monitoring Proformas
Appendix B	Silt Management Products and Guidance

Appendix A

Inspecting and Monitoring Proforma

Table 1: Basin Checklist

Basins checklist	✓
Completed levels across the system and at weirs/outfalls agree with original design drawings, if not (see next point)	
Audit trail of changes to ensure revised scheme still fulfils requirements of the original design criteria and specification	
Gradient of side slopes and width of base are as designed	
Depth and cover of membrane where used are as designed	
Seed/turf mix or plants supplied comply with the original specification	
Vegetation is sufficiently dense to withstand water flow before use	

Table 4: Linear drainage channel and Catchpit Inspection Chamber Inspection Checklist

[illegible]

Table 5: Site Inspection Checklist

Description	Comments	Action	Initial
What is the current condition of the gully / linear drainage channels protection measures within the completed / un-adopted areas of the site? <i>Note any gullies / linear drainage channels requiring maintenance measures</i>			
What is the current condition of the gully / linear drainage channels protection measures within the active areas of the site? <i>Note any gullies requiring maintenance measures</i>			
Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate? <i>Consider whether additional visits should be scheduled</i>			
Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage? <i>Note is additional measures are required to reduce the run-off from these unsurfaced areas.</i>			

Are control measures in place to prevent silt runoff from unsurfaced areas and soil stockpiles <i>Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures</i>			
What is the current condition of the water bodies / watercourses (including attenuation basins / swales)? <i>Note any discolouration of the water or obvious sign of sediment within the water</i>			
Is there any dewatering of excavations taking place on site? <i>Note what activities are taking part and their location.</i> <i>Note any control measures in place.</i>			
Notes and actions to be taken:			
Completed By	Name	Signature	Date
Site Manager			

Appendix B

Silt Management Products and Guidance

The Gully Guard

Installation guide



1. Lever open gully grid. Gully Guard is designed to fit all size gullies.



2. Hold handles at top of the Gully Guard, work beads to top and insert base into water filled gully pot.



3. Lower the Gully Guard into the pot. The beads will fall freely into the void within the pot.



4. Tuck the holding handles to the side of the Gully Guard.



5. Close gully grid.

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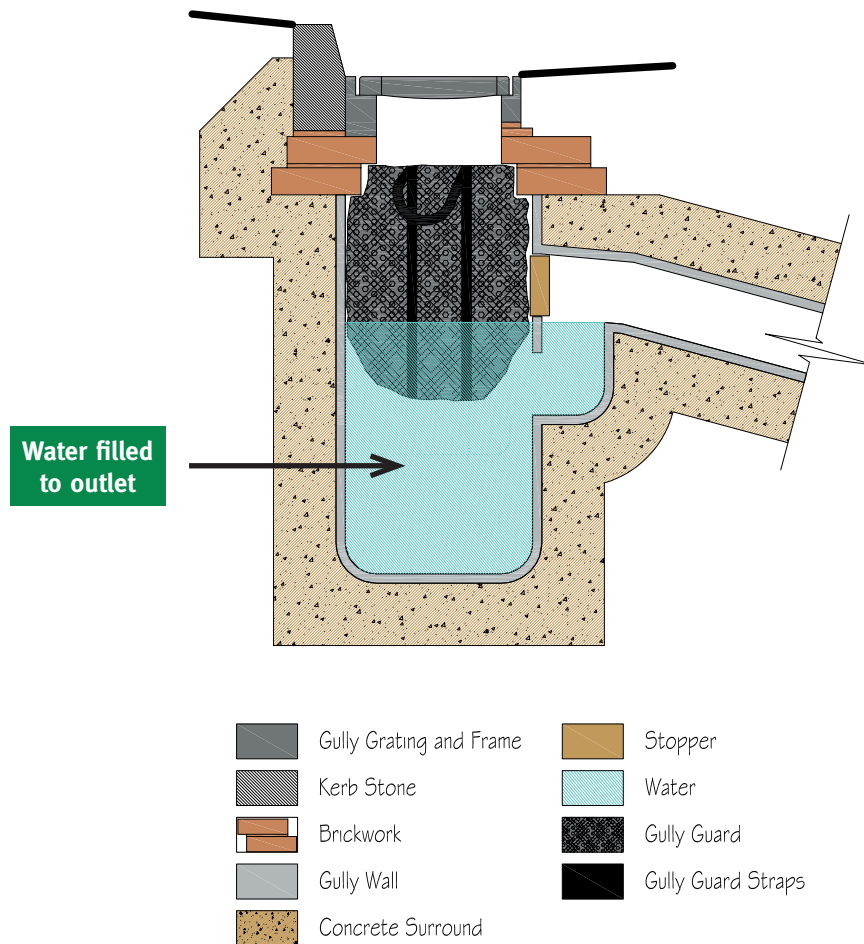
www.forestgroupuk.co.uk

Patent no. 2472690

fg The Forest Group
High performance, versatile solutions

The Gully Guard

Installation diagram



Maintenance

The Company (Forest Drainage Products) would recommend that an inspection procedure be put in place for the product by the organisation on a 3–4 months basis depending on site conditions.

Maintenance would simply involve the removal of the Product and power hose off in a bund to contain and manage silt and any contaminants prior to reinsertion back into the gully pot.

Without prior knowledge of the type and concentration of the contaminants that each Gully Guard has been subjected to, the Company cannot advise on appropriate disposal. The Company advises that an environmental risk assessment is conducted on an individual case-by-case basis to fully evaluate the nature of contaminants. In order to determine the appropriate method of disposal the Company would recommend that you follow your organisation's environmental waste disposal policy.

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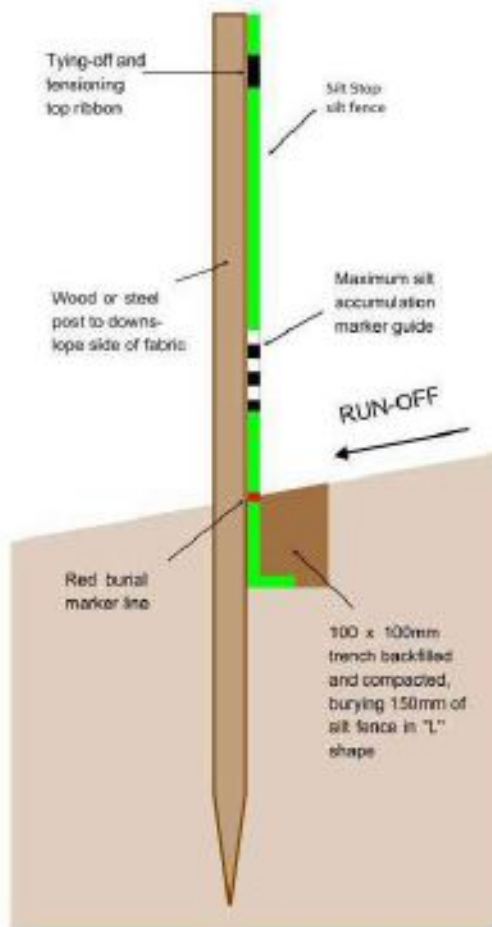
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High performance, versatile solutions

Silt Stop - Installation Guide

Figure 1: Silt stop premium



1 - Silt fences sections should be continuous and transverse to the expected flow. The silt fences should follow the contours of the site as closely as possible. Place the fence such that the water cannot runoff around the end of the fence, extending the ends upslope enough to allow the water to pond behind the fence (See figure 2).

2 - A trench shall be excavated approximately 100mm wide and 100mm deep on the upslope side of the proposed silt fence location.

3 - Bury bottom 150mm of the silt fence to the red burial marker in a "L" configuration in the trench so that no flow can pass under the silt fence. Backfill the trench and compact soil over the geotextile so that the compacted soil fills the trench.

4 - Compaction prior to installing posts is generally recommended. Compact the back-fill soil immediately next to the silt fence geotextile. Compact the upslope side first, and then the downslope side. The soil adjacent to the buried silt fence geotextile shall be compacted to achieve no less than 50% of its original insitu strength, unless otherwise specified.

[Note 1] Poor compaction is one of the main causes of silt fence failure. Installed posts may interfere with compaction by large equipment adjacent to the silt fence. Compaction is commonly accomplished with the front wheel of the tractor, skid steer, roller

or other device, as well as with manual tamping or other manual means, taking care not to damage the silt fence.

5 - When joints are unavoidable, the fabric shall be spliced together only at a support post, with a min. 300mm overlap, and securely sealed so that there are no gaps, voids or other loss of integrity of the barrier, ideally by wrapping the overlap around the post.

6 - Place the posts tight to the downslope side of the silt fence at 1.50m spacing. Drive posts a minimum of 500mm into the ground. Increase depth to 600mm if fence is placed on a slope of 3:1 or greater.

[Note 2] Where 500mm depth is impossible to attain, posts should be adequately secured/braced to stop overturning of the fence due to sediment loading.

7 - Fasten the filter fabric securely and taut to the upslope side of the posts using top ribbon (see figure 3), wire/cable ties threaded through the silt fence, or 30mm long extra wide head galvanised clout nails (the fabric shall not be stapled to existing tress). Where required, tighten top edge of fabric by looping top ribbon over posts, and stain/brace posts to maintain fence tension and stability (See figure 1)

[Note 4]: If a silt fence is to be constructed across a ditch line or swale, the fence length must be sufficient to eliminate end flow, the plan configuration shall resemble an arc or horseshow with the ends orientated upslope and post spacing a maximum of 1.00M.

Silt Stop - Installation Guide

Maintenance

- 1 The contractor shall inspect all temporary silt fences immediately after each rainfall, and at least daily during prolonged rainfall. The contractor shall immediately correct any deficiencies.
- 2 The contractor shall also make a daily review of the location of silt fences in areas where construction activities have altered the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, as determined by the engineer, additional silt fence shall be installed as directed by the engineer.
- 3 Repair damaged or otherwise ineffective silt fences or replace promptly.
- 4 Either remove sediment deposits when the accumulation reaches one third the height of the exposed fence, or install a second silt fence as directed by the engineer.
- 5 The silt fence shall remain in place until the engineer directs in to be removed. Upon removal, the contractor shall remove and dispose of any excess sediment accumulations, dress the area to give it a pleasing appearance, and vegetate all bare areas in accordance with contract requirements.
- 6 Removed silt fence may be used at other locations provided the geotextile and other material requirements continue to be met to the satisfaction of the engineer.

Figure 2: Silt fence placement

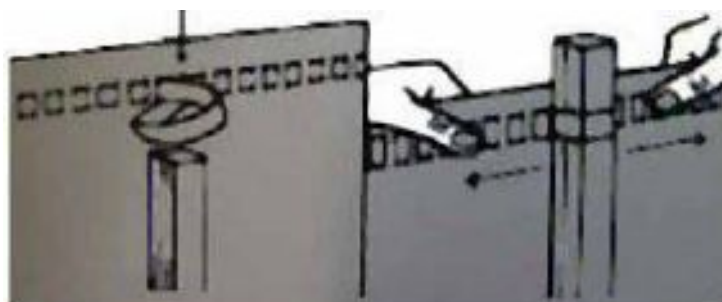


Figure 3: Ribbon attachment to post

Alignments called 'U' or 'J' hooks ensure water & sediment pond behind each fence.

DIRTBAGS



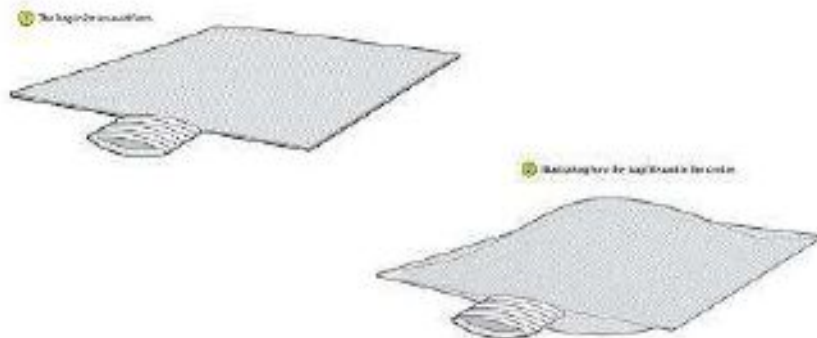
The standard size of the Dirtbag is 1.5m² giving a filtration area of 4.5m² allowing a flow rate well in excess of 4600 l/min or the pumping capacity of a 6" pump.

The Dirtbag can be used in various applications in its' raw form, as the shape & size of the bag can be determined by the end user and as Dirtbags are manufactured in the UK we can make them any shape or size to suit your exact site requirements.

Unlike other sediment control units the Dirtbags are NOT RELIANT on pumping speeds or settlement times and the bags will help retain solids from your pumped water.

The Dirtbag is fitted with a standard 10" elasticated collar which will fit around any size delivery hose or connector and you simply pump the water into the Dirtbag, the water runs through the bag which catches the solids in the water.

Dirtbag in its traditional 'envelope' form:



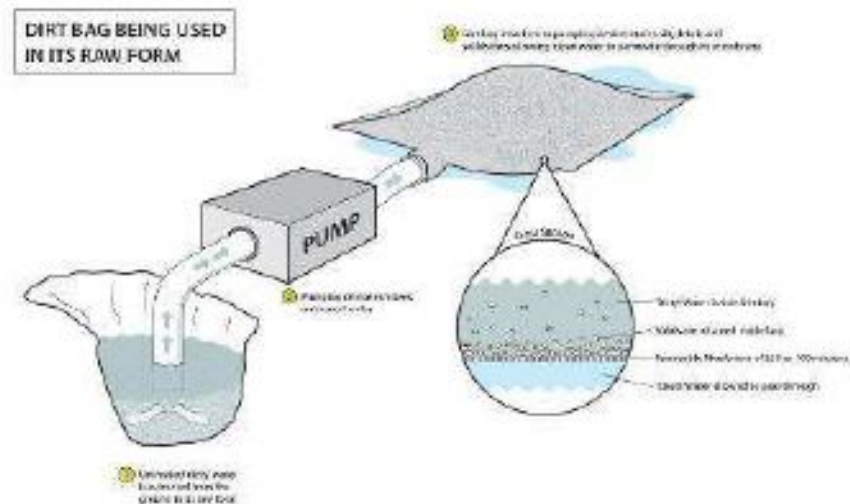
[Click on image to enlarge](#)

Dirtbags are available in 100, 200 & 500 micron filter sizes and will retain solids dependant on the filter size of Dirtbag used.

How it Works

The image below shows the Dirtbag laid on the ground whilst water is being pumped through it. This is an easy solution if your site conditions allow for site water to run away and find its own course.

The solids are retained in the Dirtbag which allows the water to flow away.



Click on image to enlarge

Once the Dirtbag has filled with solids and the Dirtbag no longer allows adequate water flow (i.e. blinded off), it is simply disposed of in accordance with your on site waste disposal guidelines and another Dirtbag is used.

“Simple”

Utility Bag



The utility bag was purpose made for small mobile street works and its simplicity has proved to be very popular with street works and utility contractors.

The Utility bag is simply laid at the kerb side, before the road gully and trench water is pumped through it which catches the solids before reaching the drainage system.

The bag can be turned inside out and re-used and is easily stored in the gang's vehicles or PPE kits until needed again.

The utility bag measures 1m x 300mm and its 10" elasticated collar means it will accept any size delivery hose.

“Dirtbags are manufactured and distributed in the UK so we can make any size bags to suit your exact requirements”

DIRTBAGS KEY ADVANTAGES:

Simple & Easy to use, light & compact for easy storage, bag can be made to any shape or size with 100, 200 or 500 micron filter sizes, 24 hour delivery if required, Indefinite shelf life, no cleaning up required just dispose of the bag once it's full, simple order and delivery process, 50 micron Dirtbags are available for certain applications on request

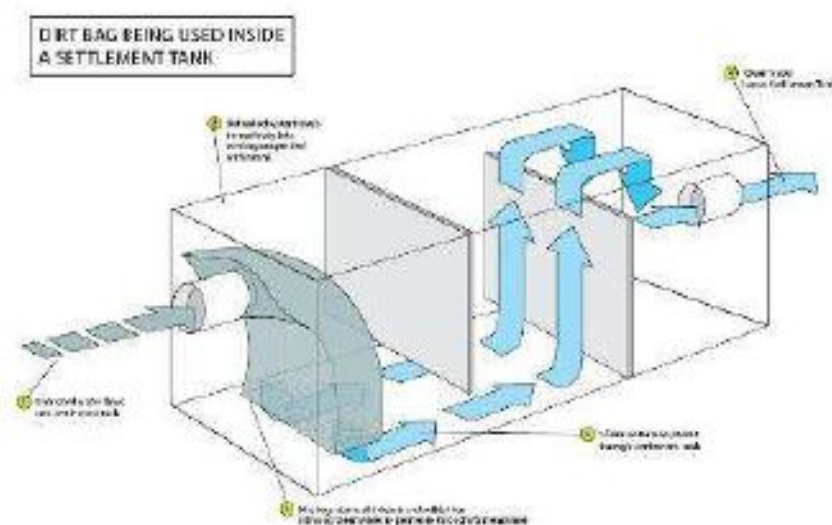
DIRTBAGS IN SETTLEMENT TANKS

There is an obvious flaw with using a settlement tank as a sediment control system as the whole process is reliant on flow rates and settlement times.

Used in the correct manner, the settlement tank can be fairly effective providing that the user knows the flow rate at which he is pumping through the tank and the amount of sediment control he needs to achieve.

In reality the user is not normally aware of this information and therefore is never certain of how effective the settlement tank is.

However, one or two of our customers overcame this problem by inserting a Dirtbag inside a settlement tank as shown in the image below.



This means that the end user can now control the outflow of water from the settlement tank whilst still using the efficiency of a Dirtbag.

However, the Dirtbags weren't designed for this purpose and removing the Dirtbag from a settlement tank can be extremely tricky.

DIRTBOX

After various trials and feedback from our customers we have designed and built:

The 'Dirtbox'

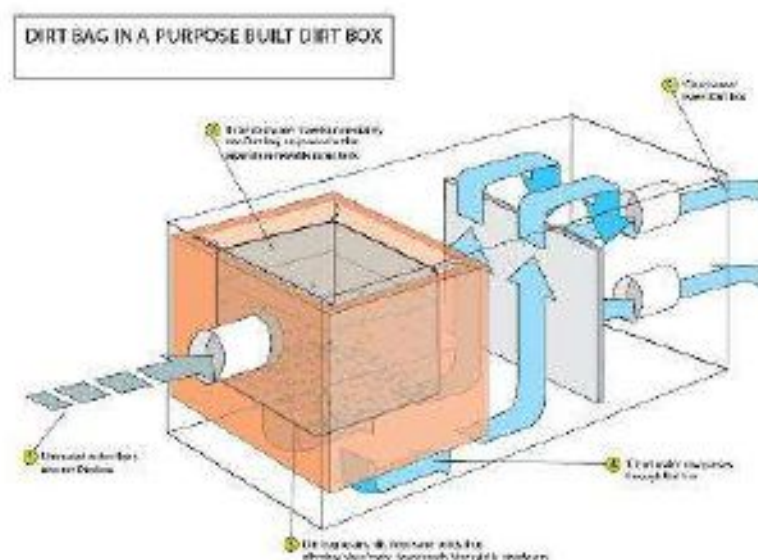
which is a purpose built tank that houses the Dirtbag and allows a much easier, safer and more controlled environment for collecting solids through the water transfer process.

For this application the Dirtbags are cube shaped and measure 1m³ giving an even bigger filtration surface area than the stand alone Dirtbag.

The Dirtbox comprises of:

- An outer tank with 1 No. 6" inlet and 2 No. 6" outlets with one blanking cap. The two outlets are situated at different heights to suit different applications and can both be used if pumping at high speeds.
- The tank measures only 1800L x 1200W X 1200H meaning it is smaller than a 1500 gallon settlement tank and takes up less room on your site.
- The inlet & outlet connectors are industry standard bauer fittings
- A removable permeable inner tank that holds the Dirtbag and is lifted out ensuring the safe & easy change and disposal of the Dirtbag
- A removable baffle plate which can be inserted to create a settlement area and catch any additional smaller silt particles if required, or removed to create an instant water flow to the outlets.

The image below shows the Dirtbag being used inside the custom built Dirtbox.



Click on image to enlarge

The Dirtbox will handle flow rates up to 280m³ per hour (1000 gallons per minute) which basically equates to a 6" pump working at full capacity.

Once the Dirtbag is full and not accepting water at the desired flow rate then simply lift out the inner tank, remove the Dirtbag and dispose as per site waste guidelines, insert a new Dirtbag and carry on pumping.

The Dirtbag contains all solids down to at least the size of the Dirtbag (100, 200 or 500 microns) and is easily disposed of leaving no mess and no cleaning up is required*

No manual lifting required as the inner tank and the Dirtbag have lifting eyes for mechanical lifting.

“The Dirtbox is available for sale or hire and really is the ideal site solution for using a Dirtbag”

Key Benefits:

- No Manual Handling
- Pumped water is controlled at all times
- Two outlets for increased water flow
- Small outer tank for sites with limited space
- Guaranteed to retain solids to 100, 200 or 500 microns & smaller**
- Easy to Use
- Removable baffle plate provides additional options
- Limited or No cleaning (dependant on application)
- Similar hire price as a settlement tank

Appendix L

Drainage Management & Maintenance Plan

Chapel Road Barnes Green

P25-1183
ISSUE: 01

Drainage Maintenance and Management Plan

Chapel Road Barnes Green

Drainage Maintenance and Management Plan

SIM Reference	P25-1183
Project Address	Chapel Road, Barnes Green, West Sussex, RH13 OPS
Document Reference	P25-1183
Client	Shanly Homes
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Author	Jl
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1 Introduction 1

2 Maintenance and Management Plan..... 2

1 Introduction

1.1.1 This report details the operation and maintenance requirements for the drainage system of the Shanly Homes residential development at Chapel Road in Barns Green.

1.1.2 The drainage system comprises of separate foul water and surface water drainage networks.

- The foul water drainage network comprises of a traditional gravity network of below ground pipework that discharges to the existing foul sewer located to the south of the site in Chapel Road.

1.1.3 The surface water drainage network comprises of a sustainable drainage system that includes a variety of components that are designed to intercept, treat, control and attenuate surface water runoff from the development before discharging to an existing surface water culvert in Chapel Road. The main components include:

- Rainwater harvesting units located in rear gardens for the purposes of irrigation and cleaning of external areas.
- Permeable paving for interception and treatment of surface water runoff from private drives and parking areas.
- A combination of swales and bioretention systems for interception, treatment and conveyance of road runoff.
- A traditional below ground surface water drainage system located in the developments estate roads with narrow below ground attenuation tanks and flow controls, which control and store all runoff to a peak rate of 9.5 l/s for up to and including a 1 in 100 year including 45% allowance for climate change using a cascading approach.

1.1.4 Maintenance responsibility for the drainage systems varies:

- Property owners are responsible for the individual drainage systems serving each individual property, within the property curtilage.
- Shared systems and all systems outside a properties curtilage are maintained by a management company funded by a service charge.
- The offsite connection within Chapel Road will be adopted and maintained by Southern Water.

1.1.5 On occupation of the development, this maintenance and management plan should be incorporated into the sites Operation and Maintenance Manual with the as-built drainage system operated and maintained in accordance with the schedules in Section 2.

1.1.6 Any Maintenance Contractor tasked with carrying out any maintenance work to the drainage systems should; provide a risk assessment and method statement that adopts best practice health and safety policies for maintenance personnel throughout the duration of any maintenance works. Measures may include:

- Ensure the use of safe systems of work and procedures are followed.
- Certificated operatives only to be used for all confined space entry.
- Ensure appropriate PPE is worn at all times including the use of safety goggles, ear defenders and other relevant equipment when using high pressure jetting.
- Do not work in weather conditions where flooding or surging is likely.
- Erect barriers where appropriate and provide adequate lighting.
- No operations to be carried out by operatives working alone.
- Time maintenance to not conflict with other on-site activities.
- Method statement to be prepared and approved prior to entry into confined space.

2 Maintenance Schedules

2.1.1.1 On occupation of the development, each element of the as-built drainage system should be maintained in accordance with the regime set out in the tables below.

Table 1: Below Ground Drainage System - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove all litter and debris from external hard landscaped areas and adjacent landscaping, which may pose a risk to the performance of the system.	Monthly.
	Remove build-up of sediment / silt in catch-pits and dispose of oils / petrol residues using safe standard practices.	As required.
	Stabilise and mow adjacent landscaped areas and remove weeds.	
Remedial actions	Repair or rehabilitate inlet and outlets to ensure they are in good condition and operating as designed.	
	Remediate any landscaping, which has raised to within 50mm of the level of adjacent hard landscaping.	
Monitoring	Check of all inlets / outlets for blockages or evidence of physical damage with any necessary remedial action or clearance carried out if required.	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.
	Inspect all surfaces for ponding or silt accumulation. Record areas where water is ponding for more than 48 hours and carry out any remedial work deemed necessary.	After severe storms.

Table 2: Grey Water Harvesting - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris.	Annually (or following poor performance).
Occasional maintenance	Replacement of any filters.	Every 3 months.
Remedial actions	Repair of erosion damage, or damage to tank.	As required.
	Pump repairs.	
Monitoring	Inspection of the tank for debris and sediment build up.	Annually (or following poor performance).
	Inspection of inlets, outlets and withdrawal devices.	
	Inspection of areas receiving overflow, for evidence of erosion.	
	Inspection of roof drain filters.	
	Inspection of any pumps – check function and wiring.	Annually.

Table 3: Permeable Paving - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Remove all litter and debris from drained surfaces areas and adjacent hard / soft landscaping, which may pose a risk to the performance of the system.	Monthly.
	Sweep permeable paved areas. If necessary use jet wash or suction sweeper. Any jointing aggregate lost from the joints must be replaced as necessary with 2/6.3mm single sized aggregate, brushed into joints.	Three times a year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging.
	Stabilise and mow adjacent landscaped areas and remove weeds.	As required.
Remedial actions	Remediate any landscaping, which has raised to within 50mm of the level of adjacent hard landscaping.	
	Carry out remedial work to any depressions, rutting and cracked or broken paving blocks within the permeable paved areas that are considered detrimental to the structural performance or a hazard to users.	
	Carry out repair / rehabilitation works to inlets, outlets, overflows and vents.	
Monitoring	Inspect silt accumulation rates within the permeable paved areas and establish appropriate brushing frequencies.	Annually.
	Check of all inlets, outlets, overflows and vents for blockages or evidence of physical damage with any necessary remedial action or clearance carried out if required.	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.
	Inspect and identify any areas that are not operating correctly	On a monthly basis for the first 3 months of operation, thereafter every 6 months & following severe rainfall events.

Table 4: Swales - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	Monthly or as required.
	Grass cutting – to retain grass height within specified design range.	Monthly during growing season or as required.
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required.
Occasional Maintenance	Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible.	Annually.
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required.	Annually, or if bare soil is exposed over 10 % or more of the swale treatment area.
Remedial actions	Repair erosion or other damage by re-turfing or reseeded.	As required.
	Re-level uneven surfaces and reinstate design levels.	
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	
	Remove build up of sediment on upstream gravel trench, flow spreader or at top of filter strip.	
	Remove and dispose of oils or petrol residues using safe standard practices.	
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly.
	Inspect infiltration surfaces for ponding, compaction, silt accumulation. Record areas where water is ponding for > 48 hours.	Monthly, or when required.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

Table 5: Geocellular Storage Tanks - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for first 3 months of operation, then every 6 months.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly.
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly / after severe storms.
	Remove sediment from pre-treatment structures.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms.

Table 6: Flow Control Chamber / Non Return Valves - Operation and Maintenance Requirements

Maintenance schedule	Required action	Frequency
Regular maintenance	Cleaning off the flow control device of any debris/ sediment	As required
Remedial Actions	Flow control device repairs.	As required
	Repair of erosion damage, or damage to chamber.	
Monitoring	Inspection of the chamber for debris and sediment build up.	Monthly for first 3 months, thereafter, every 6 months and following severe storm events.

